The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XVII. No. 437 NOVEMBER 12, 1927 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

PAGE

EDITORIAL NOTES: The Synthetic Nitrogen Position; Problems of the Future; The Continuous Hydrogenation of Oils; The Policy of the I.G.; U.S.A. and European Combines 429
World Production of Synthetic Nitrogen Compounds..... 432
The Continuous Hydrogenation of Oils..... 434
The Present Position of the I.G. 435
The Oxidation of Hydrocarbons to Formaldehyde..... 436
Correspondence: Registration and the Title "Chemist".. 438
Book Reviews 439
Chemical Matters in Parliament..... 441
From Week to Week..... 442
References to Current Literature..... 443
Patent Literature..... 444
Weekly Chemical Prices and Market Reports..... 447
Company News; New Chemical Trade Marks; Chemical Trade Inquiries 452
Commercial Intelligence; New Companies Registered..... 454

DYESTUFFS MONTHLY SUPPLEMENT: "Fastness from the Maker's Point of View," by R. S. Horsfall, etc..... 33-40

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices: Bouverie House, 154, Fleet Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

The Synthetic Nitrogen Position

THE annual report of the British Sulphate of Ammonia Federation is rightly regarded as one of the most authoritative documents of the year, and the one just issued, of which the substance is published on another page, illustrates the enormous growth of the fertiliser industry and the remarkable developments which have taken place especially in the synthetic nitrogen field. When the war ended less than 10 years ago the fixation of atmospheric nitrogen in this country was merely a theory. In Germany throughout the war years the Haber process was commercially at work and made Germany independent of the supplies of natural nitrate which we, on the other hand, had to ship from South America. The other countries of the world were in much the same position. So rapidly have plants for the manufacture of synthetic nitrogen grown up in all parts of the world that the problem of the near future will be how to make consumption keep pace with production. Perhaps, indeed, the most notable feature of the past year's report is the warning it contains that the production of synthetic nitrogen may shortly considerably exceed the limits of world consumption.

It is estimated that if the synthetic works now in course of construction or announced by responsible corporations are completed according to plan, the annual production of fixed nitrogen in the world will have increased by 1930-31 to about 2,000,000 tons. This figure makes no allowance for any production in Chile which, if only continued on the present low scale, would bring the total quantity of nitrogen then available up to 2,200,000 tons. This figure exceeds the present consumption by 900,000 tons, so that an increase in use at the rate of 225,000 tons per annum for the next four years must be assumed if consumption is to keep pace with production. The actual increase in consumption during the four years 1923-27 has been 261,000 tons, or an average rate of 65,000 tons per annum. During this period the prices of sulphate of ammonia have fallen from £13 6s. to £9 16s. per ton, or 26 per cent. This downward price tendency is confirmed if a longer period is taken for purposes of comparison. For example, in the last ten years, we find that the peak figure was reached in 1920-21, when the price stood at £23 15s. 3d. Since then there has been a consistent decline to the present figure of £9 16s. 1d. In view of these figures the Federation seem fully justified in warning those who are about to embark on the manufacture of synthetic nitrogen that they must be prepared to face the level of price that is likely to be reached in an endeavour to quadruple the average annual increment of the past four years.

Problems of the Future

Two vital facts to be faced, therefore, for the future are, first, the absence of any hope of a substantial rise in price, but rather the prospect of a further decline, and, secondly, a steady increase of production threatening to overtake and outrun the present limits of consumption. This situation can only be met by a possible further cheapening of the costs of production and by opening up increased or entirely new uses for synthetic nitrogen fertilisers. The latter seems to indicate the main line of attack. In this country already a very large organisation has been set up to take charge of research and propaganda, and the expenditure on this work is already at the rate of £140,000 per annum. The three main purposes of this research and propaganda scheme are to establish a general repository of scientific and practical information, to devise systematic means for the dissemination of that information, and to discover in various parts of the Empire new fields for the application of artificial fertilisers. Already it is understood that notable results have been achieved in India and China, and this seems to suggest that in tropical countries the limits of consumption may considerably exceed present expectations. On the other hand, it has been found that in Western Canada the results are less encouraging, and experi-

ments for the moment have been discontinued. In this country there is a possible expansion in the more intensive cultivation of various crops, and up to now no fewer than 80 trials have been in progress on a new system of grassland management. It is too early to indicate the results of this work, but it may reasonably be expected that if continued on a world scale it will make possible the economic use of artificial fertilisers to an extent unrealised at present.

It is interesting to note in the statistics of world production that synthetic sulphate of ammonia is now virtually on a level with by-product sulphate, the respective estimated figures being 300,000 tons and 303,200 tons. As a result of the coal stoppage of last year there has been a general decrease in by-product output. The actual decrease in Great Britain was about 22,000 tons of nitrogen, or 5 per cent. Production of synthetic forms of nitrogen increased 18 per cent. While sulphate of ammonia retained its leading position among the world's fertilisers, some of the newer synthetic products are reported to be in great and increasing demand. This is especially the case with German nitrate of lime and ammonium-sulphate-nitrate (Leuna Salpeter).

The Federation's report contains a number of features of general interest. Among the more notable mentioned are the introduction on a commercial scale by Germany of "Nitrophoska," the new synthetic combined fertiliser, and the appearance in the market of Italy as an exporter of synthetic sulphate. Comparing British and United States figures, it appears that British exports of sulphate of ammonia decreased from 248,752 tons in 1925 to 150,167 tons in 1926, while United States exports increased from 122,498 tons to 174,159 tons. This rather marked change is, of course, explained by the exceptional circumstances of last year. It is something of a surprise to hear on the authority of the Federation's report that the only satisfactory feature in the export trading position is a further substantial increase in sales to China.

Advances in Oil Hydrogenation

EVIDENCE of the keen interest taken in the hydrogenation of oils was supplied by the crowded meeting of the Society of Chemical Industry held at Burlington House on Monday, when four papers were read, dealing with "Recent advances in the Hydrogenation of Oils," from several points of view. Mr. E. R. Bolton, in his general introduction, pointed out, in relation to the catalyst, that the type of surface was all important. The sample of nickel wool which was passed round the room illustrated this point, and made it clear that this type of catalyst is preferable to the powdered form. Hitherto, the latter has been the one generally used, but as in its regeneration, according to one speaker, a small chemical works was involved, it has now been superseded by other forms. Plant for the reactivation of the catalyst described by Mr. Bolton merely requires a fraction of the space demanded by the regeneration of the powdered form of catalyst.

The hydrogenation plant is of fairly simple construction, and consists of four or more Monel tubes in which the catalyst, made in the form of a cage, is placed. Preparatory to use, the nickel has to be treated in order to render it in suitable condition for activation. Usually, the tube constitutes the anode, and the cathode is generally the container. After eight hours with a current of low density the nickel becomes thoroughly oxidised. For this operation 1 ampere per lb. of nickel is required. An electrolyte of sodium carbonate is used. This is subsequently removed by washing. The reaction vessels made by Rose, Downs and Thompson, Ltd., are of simple construction. One speaker, who had seen a plant in operation, said that the hydrogenation of oil by the Bolton process was remarkably simple. It was only necessary to feed the oil at a predetermined rate, and the solid product was discharged at the outlet in a continuous manner. Mr. Bolton, who some years ago assumed the rôle of prophet, has certainly realised his prediction that the process for the hydrogenation of oils can be continuous.

There is no poisoning if the oil and the hydrogen are both pure. Any reduction of the activity of the catalyst may be compensated for in three ways: firstly, by an increase of flow of the oil; secondly, by an increase of temperature; and thirdly, by an increase of pressure. Three experiments were described and graphs were exhibited showing how the out-flow of the product could be maintained by controlling the operation by each of the methods indicated. The rate of hydrogenation is as the square root of the pressure, and not, as is sometimes supposed, proportionate to the pressure. Before the catalyst is reactivated, it must be washed with a solvent, to extract the oil. The output of a plant is inversely proportional to the degree of hydrogenation. The nickel loss is unknown as yet, but in any case is believed to be very small.

The contributions by Mr. K. A. Williams, B.Sc., Mr. K. G. Pelley, F.I.C., and Mr. E. J. Lush, M.A., dealing respectively with "Selective hydrogenation," "Hydrogenation of fatty acids in neutral oils," and "The activity of a nickel catalyst," were very interesting. It would appear that nickel carbonate, in the crystalline form, facilitates hydrogenation, and the presence of iron has an important bearing on the activity of the catalyst. More information must be sought concerning the marked activity resulting from the presence of iron. A good deal of obscurity still surrounds this aspect of the subject. The observations made by Mr. Lush concerning the physical state of the reactant, and the conditions under which naphthalene can be hydrogenated in the production of tetraline and decaline, constituted an important contribution to our knowledge of the subject. It is interesting to know that increased hydrogen pressure is the important factor in the hydrogenation of naphthalene to decaline, and that catalysts constituted of nickel-with-alumina and nickel-with-silica were relatively ineffective. It is certain that the publication of the four papers will be awaited with interest, and that they will be the subject of keen study.

The Policy of the I.G.

THE statement just issued by a German banking house in regard to the I. G. adds little to what is already known with regard to the industrial activities of that concern. It does, however, show in a clear light the apparently pacific attitude of the I. G. towards competitors at home and abroad. It is suggested that the I. G. does not necessarily desire monopolies in the

various lines in which it has a strong position, but that it prefers to make "arrangements" with competitors rather than fight them for supremacy. There is considerable interest in the fact, stated by the German bankers, that through its acquisition of the Kŏln-Rottweil Co. the I.G. has established a connection with Nobel Industries in Great Britain and with the du Pont Co. in America. A new point emerges in the connection between the I.G. and the French Kuhlmann Co., through the holdings of both in the Farbstoff-Fabrik Durant and Huguenin A.G. in Basle. Attention may also be drawn to the agreement recently made between the I.G. and the Norsk Hydro with regard to the utilisation by the latter of the Haber-Bosch process, and finally to the fact that the I.G. is said to be in close touch with the Italian dyestuff industry. In addition, of course, there are a number of agreements with oil companies with regard to the exploitation of the coal liquefaction processes.

Of new developments there is little to be seen at the moment. The fact "that it appears as if the I.G. is following up some important plans or projects in Chile" (i.e., as regards the nitrate industry) has already been commented on in these columns as a possibility. Preparatory work on the production of artificial rubber is said to be far advanced, but that is a rather old story. It will be time enough to feel agitated about it when there is much more evidence of its reality than exists at present. The I.G. is in a stronger position with regard to nitrocellulose lacquers. It has been concentrating for some time on the production of the requisite materials, and is clearly impressed by the magnitude of the trade in this field, now controlled by the United States.

U.S.A. and European Combines

THE United States financial people, and especially its chemical interests, continue to be agitated by the fear of European combines. The formation of what is called "the great European chemical trust" is described as "another effort on the part of Europe to develop by means of cartels the benefits of mass production and mass marketing." This lesson has been learned from the United States, according to the current review issued by Dominick and Dominick, the New York banking house, and the opinion is added that instead of an occasion for alarm, the new cartel is more rightly a challenge to the initiative and efficiency of the American chemical industry.

From a position of relative unimportance before the war, it is stated, the American chemical industry, profiting by the collapse of European chemical exports, had become at the end of the conflict the largest chemical exporter in the world. The study which Germany had devoted to synthetic production during the war, however, bore fruit in 1925, when that country was able to regain the lead. Synthetic methanol and synthetic nitrate were important factors in this recovery. In 1926 Germany exported $256,000,000 of chemicals, as compared with $171,000,000 for the United States and $125,000,000 for England, while France exported $114,000,000. The new European combination, therefore, comprising Germany, France and England, has an export trade of approximately $500,000,000.

"It is significant," this New York authority states, "that this combination represents a triumph of synthetic production as opposed to the use of national resources. Its purpose is admittedly to recover the South American and Far Eastern markets which were lost in part to the United States in the war. By co-operating in the machinery of distribution and thus reducing overhead charges, and by allotting sales and markets to the participating countries, the combination expects to compete more effectively with the American export trade."

The Calendar

Nov 14, 16 & 18	University of London, University College: Gow Lectures: "The Colloid Chemistry of the Rubber Industry." Dr. E. A. Hauser. 5.15 p.m.	London.
14	Ceramic Society: "Electrical Pottery Firing." B. J. Moore and A. J. Campbell. "The Utilisation of Waste Heat for Steam Raising." Dr. G. Martin. 7.30 p.m.	North Staffordshire Technical College, Stoke-on-Trent.
14	Institute of Metals, Scottish Section: A. Logan, "Brass Foundry Practice." 7.30 p.m.	Institute of Engineers and Shipbuilders in Scotland, Glasgow.
14, 21, 28 & Dec. 5	Royal Society of Arts (Cantor Lecture): "Alloy Steels, their Manufacture, Properties and Uses." Professor H. C. H. Carpenter. 8 p.m.	John Street, Adelphi, London.
Nov. 16	Halifax Textile Society: "The Science of Colour as Applied to the Textile Trade." E. Greenhalgh. 7.30 p.m.	White Swan Hotel, Halifax.
17	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
17	Institute of Metals (Birmingham Section): Open Discussion—Annealing. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham.
17	Society of Dyers and Colourists (Midlands Section). Joint meeting with the Foreman Dyers' Guild: "The Standardisation of Fastness of Dyestuffs." Dr. S. G. Barker. 7.30 p.m.	Leicester Technical College.
17	Institute of Chemistry and Society of Chemical Industry (Edinburgh and East of Scotland Sections): "Chemical Formulæ of Long Ago." Professor R. M. Caven. 7.15 p.m.	Pharmaceutical Hall, 36, York Place, Edinburgh.
18	Society of Dyers and Colourists (Manchester Section): "The Microscopic Investigation of Artificial Silk Fibres." L. G. Lawrie.	Manchester.
18	Institute of Chemistry (Leeds Area Section): Annual General Meeting. "The Training of a Leather Chemist." H. Salt.	Leeds.
18	Chemical Engineering Group: "Some Modern Methods of Recovery of Lubricating Oils." A. J. Broughall. 8 p.m.	Burlington House, Piccadilly, London.
18	Blackburn Textile Society: "The Cotton Trade and Research—the Work of the Shirley Institute." Dr. R. H. Pickard. 7.30 p.m.	Technical College Blackburn.
18	Institute of Chemistry: Council Meeting.	30, Russell Square, London.
18	West Cumberland Society of Chemists and Engineers: "Behaviour of Metals at High Temperatures." Professor F. C. Lea. 7 p.m.	Technical College, Workington.
21	British Science Guild: Annual Norman Lockyer Lecture. The Very Rev. Dean Inge.	Goldsmiths' Hall, London.
22, 29 & Dec. 6, 13	Royal Institution of Great Britain: "A Year's Work in X-Ray Crystal Analysis." Sir William Bragg. 5.15 p.m.	21, Albemarle Street, London.

World Production of Synthetic Nitrogen Compounds

Threatened Excess Over World Consumption

The seventh annual report of the British Sulphate of Ammonia Federation contains a comprehensive review of the synthetic nitrogen position throughout the world, with special reference to the sulphate of ammonia industry at home and abroad. The substance of the report is published below.

THE past year was the thirtieth year of propaganda work undertaken successively by the Sulphate of Ammonia Committee, the Association, and the Federation. On December 1, 1926, Nitram, Ltd., became responsible for propaganda.

World's Production and Consumption of Fixed Nitrogen

During the year under review there was a reduction of 96,000 tons, or 7 per cent., in the production of the forms of nitrogen enumerated below, this figure being the result of a reduction of 200,000 tons in the form of Chile nitrate and an increase of 104,000 tons in the other forms.

The total consumption increased by 54,000 tons, or 4⅓ per cent., following on an increase of 109,000 tons, or 10 per cent., in the previous season.

The following figures are offered as fair estimates of the output of the various forms, but strict accuracy is not claimed for them :

WORLD PRODUCTION AND CONSUMPTION OF NITROGEN IN METRIC TONS OF PURE NITROGEN, FOR THE YEAR ENDING MAY 31.

	1923–24.	1924–25.	1925–26.	1926–27.
PRODUCTION.				
By-Product Sulphate of Ammonia ..	264,600	278,300	296,700	303,200
Synthetic Sulphate of Ammonia ..	231,100	255,000	289,200	300,000
	495,700	533,300	585,900	603,200
Cyanamide*	104,000	115,000	150,000	180,000
Nitrate of Lime	18,000	25,000	30,000	81,000
Other forms of Synthetic Nitrogen† ..	51,100	66,100	120,700	133,400
Other forms of By-product Nitrogen† ..	50,200	47,400	47,700	40,300
Chilean Nitrate of Soda	338,500	367,500	399,400	199,600
Total Production	1,057,500	1,154,300	1,333,700	1,237,500
CONSUMPTION.				
Consumption of Manufactured Nitrogen	719,000	786,800	934,300	1,037,500
Consumption of Chilean Nitrate of Soda	340,000	363,000	324,200	275,200
Total consumption	1,059,000	1,149,800	1,258,500	1,312,700
Agricultural consumption, about ..	934,000	1,020,000	1,117,000	1,200,000

* Excluding cyanamide made in Japan, which is included under synthetic sulphate of ammonia.

† Including ammonia liquor used for industrial purposes.

(N.B.—Data recently obtained show that estimates given in previous reports for agricultural consumption were too low, as the figures taken for the industrial use of Chile nitrate were too high. On the other hand, a paper published in 1926 by Dr. Harry Curtis shows that the proportion of ammonia liquor consumed for industrial purposes in the United States was greater than the figure hitherto assumed in these reports. The figures given above have been corrected accordingly, and the whole table expressed in metric tons.)

New Synthetic Products

The decrease in the by-product output is wholly due to the prolonged coal stoppage which followed on the general strike in Great Britain in May, 1926 : the actual loss in Great Britain was about 22,000 tons of nitrogen, or 5 per cent. of the output, but the net loss was reduced to 900 tons by an increase of 21,000 tons in other countries.

Production of synthetic forms of nitrogen increased by 104,500 tons, or 18 per cent., and the bulk of this was produced in Germany. According to German newspapers, the total output in Germany during the year under review was 580,000 tons of nitrogen, of which about 70,000 tons was represented by by-product ammonia.

In order to encourage home use, the German Nitrogen Syndicate fixed prices for 1926–27 at 10 per cent. below the level for 1925–26. The policy was amply justified by an increase in German consumption of no less than 71,000 tons of nitrogen (a figure which exceeds the total present British output), the totals being 325,000 tons for 1925–26 and 396,000 tons for 1926–27.

This cut in German internal prices forced makers of fixed nitrogen in other countries to follow suit, but producers in Chile refused to reduce their prices. As a result, while the other makers were able to sell approximately their whole output, the Chilean producers not only lost a further 16 per cent. in consumption (following on 11 per cent. in the previous season), but were forced to reduce their production by 50 per cent.

An analysis of the figures given above shows that while sulphate of ammonia retains its leading position among the world's fertilisers, some of the newer synthetic products are in great and increasing demand. This is specially the case with German nitrate of lime and ammonium-sulphate-nitrate (leuna salpeter).

Notable features of the year have been the introduction on a commercial scale by the German Nitrogen Syndicate of "Nitrophoska," a synthetic fertiliser containing about 57 per cent. of plant food combining nitrogen, phosphoric acid, and potash in various proportions : and the appearance in the market of Italy as an exporter of synthetic sulphate of ammonia.

Fears of Overproduction

Last year in dealing with the general position in the nitrogen market, we concluded our report with a note of warning as to the future course of prices. Fresh building programmes for synthetic plant announced during the year and the probability of a considerable reduction in the price of Chile nitrate in the near future seem to justify a repetition of that warning.

If the synthetic works now in course of construction (or announced by responsible corporations for creation) are completed according to plan, the annual production of fixed nitrogen in the world will have increased to about 2,000,000 tons by 1930–31. This figure makes no allowance for any production in Chile, which if only continued on the present low scale would bring the total quantity of nitrogen then available up to 2,200,000 tons. That figure exceeds the present consumption by 900,000 tons, so that an increase in use at the rate of 225,000 tons per annum over the next four years must be assumed, if consumption is to keep pace with production. The actual increase in consumption during the four years 1923–27 has been 261,000 tons, or at an average rate of 65,000 tons per annum. During this period prices for sulphate of ammonia have fallen from £13 6s. to £9 16s. per ton, or by 26 per cent. Those who are about to embark on the manufacture of synthetic nitrogen must be prepared to face the level of price which is likely to be reached in an endeavour to quadruple the average annual increment of the past four years.

British and American Exports

British and American exports of sulphate of ammonia for the last seven calendar years were :

	(Ton = 2,240 lb.) Exported from United Kingdom.	United States.	Total
	Tons.	Tons.	Tons.
1920	110,016	89,566	199,582
1921	128,433	102,614	231,047
1922	145,255	147,331	292,586
1923	247,536	150,595	398,131
1924	263,012	115,047	378,059
1925	248,752	122,498	371,250
1926	150,167	174,159	324,326

Home Production and Distribution

The figures for total production are taken from the alkali inspector's report, and relate to the calendar year, while the remaining figures relate to the "fertiliser" year commencing June 1 in each year, hence the quantity stated below as exported for "1926" was exported during the year June, 1926, to May, 1927.

	Total production of Ammonia as Sulphate of Ammonia. (Based on Alkali Report.)	Production of S.A. as such.	Exported.	Used for Home Agrl. Consumption.	Nitrate of Soda used for Home Agrl. use.
1913	432,600	372,000*	323,440	40,000*	80,000*
1914	426,400	363,000*	305,560	50,000*	80,000*
1915	426,300	350,000*	264,610	64,000*	40,000*
1916	433,700	315,500	188,270	144,600	5,000*
1917	458,600	283,500	31,740	234,000	5,000*

1918	432,600	331,500	37,630	269,000	10,000*
1919	397,500	361,360	116,130	233,500	40,000*
1920	409,875†	315,630	134,380	166,920	40,000*
1921	260,850†	229,390	116,380	136,000	55,000*
1922	361,675†	340,000	186,050	140,200	57,000*
1923	441,632†	401,400	258,280	142,400	50,000*
1924	467,072†	415,000	261,130	153,200	40,000*
1925	442,402†	394,850	223,210	168,650	35,000*
1926	331,348†	349,040	137,320	169,340	33,000*

* Estimated. † Basis 25 per cent. Ammonia.

N.B.—Our figures for the consumption of nitrate of soda in agriculture have been challenged in an official United States publication as being too low. Recent estimates of the quantities consumed in the manufacture of explosives and sulphuric acid confirm the correctness of our agricultural estimates.

Home Agricultural Consumption

The table given below shows that sales of sulphate of ammonia for agricultural use in the home market were well maintained last season in spite of the financial and climatic conditions under which farmers suffered. The total annual consumption of pure nitrogen in the United Kingdom for all purposes is now about 48,300 tons, of which about 7,800 tons is used in industry.

The detailed figures for sulphate of ammonia are as follows :

	Home Consumption in Scotland.	Ireland.	England, Wales, and Channel Islands.	Total.
1919–20	71,900	42,000	119,600	233,500
1920–21	50,900	26,000	90,020	166,920
1921–22	33,600	19,400	83,000	136,000
1922–23	42,100	20,000	78,100	140,200
1923–24	41,000	21,800	79,600	142,400
1924–25	42,800	22,600	87,800	153,200
1925–26	44,930	26,140	97,580	168,650
1926–27	43,670	28,280	97,390	169,340

Exports

The coal stoppage greatly reduced the quantity of sulphate of ammonia available for export, and we were only able to maintain our position in overseas markets by purchasing very large supplies in other countries.

The official figures for exports from the United Kingdom given elsewhere in this report show that there was a total reduction of 85,900 tons, or 37 per cent., compared with last season, which in turn had shown a 15 per cent. reduction on the previous year.

The only satisfactory feature in the export trading position is a further substantial increase in sales in China, which is due to the unremitting efforts of our agents, Brunner, Mond and Co. (China), Ltd., in the face of extraordinary difficulties.

General Average Prices

The following are the average prices per ton for all deliveries, home and export, free on rails at makers' works in single bags free :—

	For 24¾ per cent. Ammonia.	For 25½ per cent. Ammonia, Neutral.
	£ s. d.	£ s. d.
1917–18	16 7 3	——
1918–19	18 6 9	19 6 6
1919–20	22 13 3	23 15 3
1920–21	21 8 8	23 0 2
1921–22	12 13 3	13 19 3
1922–23	14 0 0	15 6 0
1923–24	11 19 11	13 5 11
	For 20·4 per cent. Nitrogen.	For 21·1 per cent. Nitrogen.
1924–25	10 18 0	12 5 6
1925–26	9 11 3	10 18 9
1926–27	8 8 7	9 16 1

Nitram, Ltd.

The formation of this company was noted in our last report. During the year under review a scheme has been approved at district meetings and also at the last general meeting of the members of the Federation, whereby Nitram has been appointed sole selling agent on a non-profit basis for the sulphate of ammonia produced by members of the Federation, and sole selling agent for all the other forms of nitrogen for agricultural consumption produced by Synthetic Ammonia and Nitrates, Ltd., a subsidiary of Brunner, Mond and Co., Ltd., now in turn merged in Imperial Chemical Industries, Ltd. An agreement embodying the terms and guarantees stipulated by the Federation is now awaiting final consideration by Imperial Chemical Industries.

The guarantees include a provision that the members of the Federation shall not be required to contribute more than 3s. per ton produced in any year towards the combined cost of administration and propaganda.

Home Prices

It was decided at the beginning of last season to sell neutral sulphate of ammonia in the home market with a minimum guarantee of 20·6 per cent. nitrogen. The actual average quality delivered was about 21 per cent.

The following are the prices charged to British farmers per ton delivered to buyer's nearest station, in recent years :—

Sulphate of Ammonia :—	1918–19. Basis 24½% Ammonia.	1920–21. Basis 24¾%. Ammonia.	1922–23. Neutral basis 25¾%. Ammonia.	1923–24. Neutral basis 25¾%. Ammonia.	1924–25. Neutral basis 21·1%. Nitrogen.	1925–26. Neutral basis 21·1%. Nitrogen.	1926–27. Neutral 20·6% N Minimum.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
July ..	15 5 0	23 10 0	16 3 0	14 5 0	14 0 0	12 5 0	13 1 0
August ..	15 5 0	23 11 0	16 3 0	14 5 0	14 0 0	12 5 0	13 1 0
September	15 15 0	23 11 0	16 8 0	14 10 0	14 2 0	12 7 0	11 7 0
October ..	15 15 0	23 11 0	16 8 0	14 12 6	14 4 0	12 9 0	11 9 0
November .	15 15 0	23 11 0	16 13 0	14 15 0	14 6 0	12 11 0	11 16 0
December..	16 5 0	23 11 0	16 13 0	14 16 0	14 8 0	12 13 0	11 18 0
January ..	16 5 0	23 16 0	16 18 0	15 2 0	14 10 0	12 15 0	12 0 0
February ..	16 5 0	24 3 6	16 18 0	15 3 0	14 12 0	12 18 0	12 3 0
March/May	16 15 0	24 11 0	17 3 0	15 5 0	14 14 0	13 1 0	12 6 0
June ..	17 0 0	19 1 0	17 3 0	15 5 0	12 5 0	13 1 0	12 6 0
Nitrate of Soda, 15½% Nitrogen : Spring price about :—	25 0 0	20 10 0	14 5 0	14 5 0	14 0 0	14 0 0	13 10 0

N.B.—The above prices for nitrate are calculated on the same delivered basis as the sulphate prices : the net price at U.K. ports was about £1 per ton less.

Propaganda Work

Under the arrangement with Nitram, Ltd., that company has taken over responsibility for the work of agricultural research and propaganda hitherto conducted by the Federation. The Federation has always recognised that it is impossible to attempt a solution of the fertiliser problem by advocating the sole use of any one type of plant food. Nitram is therefore in a position to take up the work at the point where the Federation has left off.

The scheme of agricultural research, propaganda, and publicity which has been very ably mapped out for Nitram by Sir Frederick Keeble, F.R.S., is, in essence, an expansion of the work of the Federation, and continuity of ideals and policy is assured by the association of Mr. Carroll, lately propaganda manager of the Federation, with Sir Frederick Keeble in the direction of this part of the work of the new company. We are also pleased to be able to state that Mr. A. Stanley and Mr. R. Halkett have consented to serve as Federation representatives on the Propaganda Committee of Nitram.

The goal at which the expanded propaganda department is aiming is a threefold one. Its first aim is to become the repository of all available knowledge about the use of fertilisers in agriculture with special reference to the needs of the United Kingdom and the British Empire. To this end it has been decided to purchase Jealott's Hill Farm near Maidenhead and there to conduct such researches and experiments as lie outside the scope of official experimental stations, while continuing to co-operate with the latter. Its second aim is to disseminate the knowledge obtained as widely as possible, especially in the United Kingdom and the Empire. To this end, the number of agricultural advisers in the United Kingdom has been increased and will be further augmented in course of time, and preparations on a large scale are being made to expand and render more effective the work commenced overseas. The creation of a separate Intelligence and Publicity Department is ancillary to this object. Its third aim is to create outlet for the production of fertilisers on the largest scale within the Empire.

Members will be interested to hear that Nitram's expenditure on this scheme of research and propaganda is already at the rate of £140,000 per annum.

Home Experiments

The chief event in home propaganda during the year has been the institution and successful prosecution of no less than 80 trials of the new system of grassland management. The results of last year's experimental trials on grassland were highly encouraging. The special experiments which have been

conducted at Rothamsted on the application of varying quantities of nitrogen to potatoes have provided much useful information, especially with regard to the interdependence of nitrogen and potash. The results of the barley trials, also conducted at Rothamsted, point to sulphate of ammonia as the best fertiliser for high yields combined with the best malting quality.

Propaganda abroad has been carried on in India, China, Java, Sumatra, Malay States, Palestine, the Sudan, Kenya, South Africa, Spain, Italy, the West Indies, Canada, and the Argentine. Notable results have again been obtained in India and China. On the other hand, it would appear from the trials instituted last year in the wheat belt in Western Canada that nitrogen may not be the limiting factor. Propaganda in Canada is therefore being discontinued for the present and the same applies to Egypt.

The total cost of propaganda to members of the Federation for the first half of the year was £29,237 1s. 3d. During the second half, the contribution of members of the Federation to Nitram's expenses at 2s. per ton amounted to £20,951 19s. 8d.

The Continuous Hydrogenation of Oils

A Discussion of Recent Technical Results

A DISCUSSION on "Recent Advances in the Hydrogenation of Oils" took place at a meeting of the London section of the Society of Chemical Industry at Burlington House, London, on Monday. Mr. W. J. A. Butterfield, chairman of the section, presided.

Mr. E. R. Bolton, who opened the discussion, referred to Sabatier's work on hydrogenation, the first practical application of which was the Norman patent of 1903. In spite of the fact that something like 500 patents had since been granted in respect of making various catalysts and methods of using them, the arrangements set out in Norman's patent, with minor modifications, still remained the basis of modern work so far as the powder and batch processes were concerned. The advent of the continuous process had resulted in hydrogenation processes being divided into what were now known as the batch and continuous processes, although in certain cases the line of demarcation was not very clear. The powder process had been a distinct success, and many thousands of tons of oil were hydrogenated by that method.

Evolution of the Continuous Process

Continuing, Mr. Bolton said that seven years ago his colleagues and himself commenced research with the idea of overcoming certain of the disadvantages which existed. They had in their minds the theory which he believed Armstrong and Hilditch suggested at the same time that the activity of the catalyst was directly proportional to the amount of the surface exposed to the oil. It was found, however, to be not a question of surface, but of the condition of the surface. When nickel wool (previously useless) was dipped into nitric acid, ignited, the scale of nickel peroxide reduced in hydrogen, and the tube packed with the product, oil passed through in an atmosphere of hydrogen was quite continuously hydrogenated. The whole point proved to be that it was the particular type of surface that mattered.

For works purposes the tubes containing the catalyst were 12 in. in diameter, and it was not convenient constantly to be packing these tubes and hammering the catalyst in each time. Therefore, a cage was made up of monel metal gauze, this being used for mechanical reasons—originally nickel gauze was used—and this cage was charged with the catalyst and the whole thing placed in an electrolytic bath. The tube was made the anode and the electrolyte was a dilute alkaline solution of 5 per cent. carbonate of soda, the cathode being either the container itself or, as he used a drain pipe as the container, a nickel sheet inserted for the purpose. The cages were left in this electrolyte for eight hours under the influence of a current of low density.

Mr. Bolton had on view working apparatus showing the hydrogenation of oil by the above method, which is being worked by the British Oil and Cake Works at Hull on a commercial scale. The plant at Hull has a capacity of from 25 to 50 tons per week. It was pointed out that the reduction in the activity of the catalyst was at the rate of about 10 per cent. per week, and that reduction in activity could be compensated for in three ways: (1) by decreasing the flow of oil; (2) by increasing the temperature; and (3) by increasing the pressure. The experiments had shown that the rate of hydrogenation was proportional to the square root of the pressure and not directly proportional to the pressure, as has been said by many workers.

Advantages of the Continuous Process

Finally, Mr. Bolton summarised the claims for the continuous process. The hydrogenated oil flowed from the apparatus in a clear and bright condition and required no filtration. The catalyst could be revivified by anodic oxidation and would last for years. The loss of nickel was one part in ten million. The oil was only heated for from 10 to 15 minutes during the operation, and finally there was the low cost of the plant.

Following Mr. Bolton, three of his colleagues, Messrs. K. A. Williams, R. G. Pelley, and E. J. Lush, dealt respectively with other aspects of the process, viz., selective hydrogenation and the melting point of hydrogenated oils, hydrogenation of fatty acids and neutral oils, and the activity of a nickel catalyst. It was claimed that these were the first exact measurements of the selective effect of hydrogenation, and that the work had shown that the higher the temperature the better the selection, and also that the selection was almost exactly proportional to the temperature. As regards the melting point of hydrogenated oils it was pointed out that an increase of temperature caused a rise of melting point. The activity of a nickel catalyst, it was pointed out, is controlled by the physical condition of the material being hydrogenated.

Discussion

A short discussion followed the reading of the papers. Mr. Langton referred to the simplicity of operation of the plant at Hull, which was attended by a man and a boy who appeared to have nothing to do but "hang around." In the ordinary powder process, quite a small chemical works was required for preparing the catalyst and getting it into the form it required for use, but in the plant described that evening, the space required for the re-activation of the catalyst was extremely small.

Dr. R. Lessing also spoke of the simplicity of the plant, and commented on the fact that those who had worked at this problem 20 years ago were perfectly well aware of the fact that a fatty acid could be hydrogenated very much more easily than a neutral oil. Various explanations had been put forward, and if he might venture a further one it would be that the vapour pressure of the fatty acid was considerably greater than that of a neutral oil, and it might be possible that that provided a clue.

Mr. Acland said it was a pity that in this country there is practically no hydrogenation of naphthalene, whereas 100 tons per day were being treated in Germany. He hoped that some day they would see every fair-sized gas works with its own plant for this purpose.

Dr. Anderson enquired if it were necessary to have the purest hydrogen for hydrogenation processes, or to what extent technical hydrogen could be employed. In the latter case it would be possible to depend upon our supplies of naphthalene for a very cheap source of hydrogen.

Mr. Bolton, replying to the discussion, said that some of his experiments had been carried out with steam-iron hydrogen, and this worked perfectly well, but at the same time the electrolytic hydrogen seemed to give a better product. With regard to moisture, it was desirable, if the oil was on the moist side, to vacuum dry it, but a clear bright oil was usually sufficiently dry to hydrogenate and the removal of the last traces of moisture was not necessary, although it was desirable. As an instance of the working of the plant, he mentioned a case in London of a plant in which he wished to make one or two alterations, but the owners of it would not stop the plant for the purpose, because it was working so much to their satisfaction.

Present Position of the I. G. Farbenindustrie

An Authoritative German Statement

The German banking house of Schwarz, Goldschmidt and Co., has issued a revised edition of its booklet on the I. G., in which the information regarding the latter concern is brought up to date. Important points, amplifying what has already been published in THE CHEMICAL AGE, *are noted below.*

A VERY interesting point in regard to the policy of the I. G. is that, as far as conclusions may be drawn from its present actions, it is evidently not inclined to widen the position which it holds in certain lines into an absolute monopoly. "As long as an 'arrangement' is possible, it will certainly prefer this particular position to a fight, in order to avoid the various dangers and enmities which are apt to attend a monopoly. The I. G. therefore seems to aim at making binding arrangements with competitors. Thus, for instance, acting in common with the Gesellschaft für Teerverwertung, which is on its part an exponent of the Rheinisch-Westfaelische Kohlenindustrie, it has a share in the Kobergin-Gesellschaft, which holds the German Bergius patents for pit coal.

International Policy

"Concerning international business," states the German booklet, "the I. G. also shows a certain inclination to enter into agreements. Thus there are negotiations pending with the French, English, and Japanese dyestuff industries. By acquisition of the Köln-Rottweil A.-G., the I. G. has entered into close connection with English and American concerns, *i.e.*, Nobel Industries, Ltd., and the Dupont Trust. Together with three other English companies, the Nobel Industries, Ltd., have formed the great chemical trust, Imperial Chemical Industries, Ltd. As the Nobel Co. have a holding in the British Celanese, Ltd., the I. G. is in this way indirectly connected with the English, Belgian, French, and American manufacturers of artificial silk, who are working according to the Dreyfus system. The Dupont Trust is one of the greatest chemical concerns in the United States. Besides there is in America the Allied Chemical and Dyes Corporation, with the sub-company of which, the General Chemical Co., the Badische Anilin und Sodafabrik had close relations before the war, which have now been renewed.

"The greatest chemical concern of France is the works of Kuhlmann. A connection of this concern with the I. G. exists in their common share in the Farbstoff-Fabrik Durant and Huguenin A.-G., in Basle. The I. G. is also in close touch with the Italian dyestuff industry. It is further to be united with the Gas Trust in such a way as to make the total exploitation from coal to the final products rest, trustlike, in one hand.

"All these international relations and arrangements are being further developed. In addition there exist, on the basis of the I. G. coal liquefaction processes, certain arrangements with the Anglo-Dutch Shell group and Standard Oil Co. A short time ago an agreement was affected with the latter company regarding the realisation of the experiences on both sides in raw oil in the United States. An arrangement also exists with the Norwegian Nitrogen Co., Norsk Hydro, with regard to a further enlargement of the nitrogen works of the latter, a working connection in technical and commercial respects, and a mutual exchange of shares. It further appears as if the I. G. is following up some important plans or projects in Chile. International arrangements of this kind are of very great importance for the further productive development of the I. G., seeing that it is supplying its goods to all markets of the world, and that it has its own shares in factories in numerous other countries. The total export of this concern is estimated for 1927 to amount to 550 to 650 million marks. Its home trade may be estimated to double this amount.

The Economics of Coal Liquefaction

"One may estimate the cost of an installation which is intended to produce 50,000 tons of coal oil per year, with the necessary reserves, at about 8 million marks. The cost of production per ton of refined oils, consisting of benzine, motor oil, lubricating oil, heating oil and ammonia, etc., is calculated to be about 90 marks. It will be possible to reduce this price to 70–75 marks if the power required is produced under modern conditions in the same plant. The average value per ton would vary between 140 and 190 marks on the basis of present prices according to the proportions in the mixture of the above-mentioned oil derivatives. This shows that it is from 50 to 100 marks higher than the production cost of the products. In taking the average for both figures, the result is that an installation which produces 50,000 tons at the price of about 80 marks per ton, and which sells the same quantity at 160 marks, leaves a gross profit of 80 marks per ton, *i.e.*, on 50,000 tons 4 million marks.

Nitrogen Products and Fertilisers

"The quantity of nitrogen required all over the world for the year 1930 is estimated by Professor A. W. White to be about 2½ million tons. The present production of nitrogen shows the following figures: In 1926 the total production amounted to about 1¼ million tons of nitrogen; 47 per cent. of this quantity were due to the synthetic industry, 27 per cent. were produced by the coking ovens of the gas works, and only 26 per cent. were due to Chili saltpetre. Therefore, according to the above estimate, in four years the quantity of nitrogen required in the world will be twice as great as at present. From this, conclusions may be drawn as to the business prospects of the nitrogen industry in the near future. It may be expected then that the enlarged production of nitrogen aimed at everywhere will, in the meantime, find a satisfactory market. The present production of nitrogen in Germany, according to Caro, amounts to about 600,000 tons. Of this quantity 440,000 tons are due to the Haber-Bosch process of the I. G.

"The approximate value of the annual production of fertilisers and ammonia nitrates, etc., by the I. G. Haber-Bosch works is estimated at 500 million marks. For comparison we may mention the annual sales of the potash syndicate which, with its many works, does not reach more than about 200 million marks worth. In comparing the quantities, it may be stated that the potash syndicate produced 1,143,000 tons (1924/25) and 1,122,000 tons (1925/26), whilst the I. G. production of Haber-Bosch nitrogen products and fertilisers will probably reach, in 1927, the quantity of 1,500,000 to 1,750,000 tons.

Mixed Fertilisers

"The German export of potassium nitrate now amounts to about 10 to 15 million marks per year, as compared with 110 to 120 million marks worth of sulphate of ammonia. The total German exports of nitrogen fertilisers and ammonia salts or nitrates may be estimated for 1927 to reach a value of 250 to 300 million marks. After the successful manufacture of sulphate of ammonia, urea, and potassium nitrate, the next step of the I. G. was to combine nitrogen with potash and phosphoric acid into 'Leunaphos' (with 20 per cent. of nitrogen and 15 per cent P_2O_5), also into 'Diammonphos' (with 19 per cent. nitrogen and 15 per cent. P_2O_5).

"Through the geographical alterations of our western frontier, caused by the Versailles treaty, France has become independent with regard to potash, but she has still to cover the greatest part of her nitrogen requirements by imports. In 1925 she had to import 326,000 tons of Chile-saltpetre and 126,000 tons of sulphate of ammonia, which could only be secured gradually, and of which but a small part could be obtained through French home production (Toulouse). Germany's need of phosphates offers the possibility of an exchange of goods on a large scale.

"To produce phosphoric acid cheaply in the furnace or in the electric oven out of raw phosphates, with the addition of coal or coke, and then to work it with nitrogen, potash, and lime into fertilisers free from ballast, is a problem worked at by the I. G. and also by others. The I. G., after having made careful trials, has decided to use the Lilienroth process for wholesale production. In this, yellow phosphorus is produced through distillation in the electric furnace, and is oxidised into phosphoric acid. For this purpose the I. G. are rebuilding the Reichsstickstoffwerke Piesteritz, taken on lease from the Bayerische Stickstoffwerke, into an electric installation for the production of phosphorus. The mixed fertiliser thus pro-

duced is called Nitrophoska. It is produced from chloride of potassium with nitric acid and phosphoric acid. In the meantime, 120,000 tons of Nitrophoska are to be produced per annum, worth about 30 million marks.

Artificial Silk

"Through the acquisition of the 'Köln-Rottweil A.-G.' the artificial silk interest of the I. G. has become very much greater. It is making artificial silk in works at Wolffen, Bobingen, Premnitz, and Rottweil. Entirely owned by the I. G. is the firm of Carl Neuhaus G. m. b. H. Together with the Glanzstoff-Fabriken, in Elberfeld, the I. G. has established the Aceta G. m. b. H., and, together with the Bemberg Gesellschaft, it is now a partner in the Hoelken G. m. b. H. Connections with the British Celanese, Ltd., have been made through the Dynamit Nobel, and with the American Du Pont Rayon Co. through 'Koeln-Rottweil.' The I. G. is producing viscose, and, to a small extent, also acetate silk, the latter in the Aceta Fabrik."

The I. G., through its acquisition of the "Köln-Rottweil" and Dynamit-Nobel concerns, has become a large producer of explosives and nitrocellulose products. In connection with the latter, the I. G.'s production of solvents (methanol, butanol, acetone, isopropyl alcohol, etc.), is giving it an increasingly strong position in the lacquer field.

The German booklet states that the preparatory work of the I. G. for the production of synthetic rubber is far advanced, but that its practical application depends on the wholesale price of rubber.

Constituent Companies and Agents

In a very important appendix to the booklet is given a revised list of the companies merged in the I. G. Under the heading of founders and chief members are given 13 companies; under fertilisers and agriculture, 4; under chemical works, 5; under electrochemical and metallurgical works, 13; under mineral colours, 4; under coal, lignite, and oil, 20; under compressed gases, 5; under textiles, 3; under artificial silk, 7; under celluloid, 2; under explosives, 13; under sundry firms, 11; making a total of 100. This figure must be treated with some reserve, as some of the constituent members are only partly controlled by the I. G.

The Oxidation of Hydrocarbons to Formaldehyde

Government Research Worker's Report

An account is given below of research work on "The Production of Formaldehyde by Oxidation of Hydrocarbons," carried out by Messrs. T. S. Wheeler, W. Ledbury, and R. Taylor, who worked at various times under the supervision of Mr. E. W. Blair, at the Royal Naval Cordite Factory, Holton Heath, Dorset. A monograph on this research has now been published under the above title by the Department of Scientific and Industrial Research as "Chemistry Research—Special Report No. 1" (H.M. Stationery Office, pp. 54, 1s. 9d.)

In the prefatory note to the monograph, it is stated that "formaldehyde is widely used in many industries for such purposes as disinfection, production of synthetic resins, etc. It was formerly either wholly imported in the form of a 40 per cent. solution, or made—to a small extent—from imported methyl alcohol. After the war, when the price of formaldehyde was very high (£130 per ton in 1921) considerable attention was given in various quarters to its production from home sources, either directly or indirectly through synthesis of methyl alcohol. The Chemistry Research Board [of the D.S.I.R.] decided to explore thoroughly its possible economical production by oxidation of hydrocarbons, since experiments on the production of methyl alcohol were going on elsewhere, and since, for the particular purpose of anthrax disinfection, only dilute solutions of formaldehyde were necessary. Judging from published data of laboratory experiments, oxidation of hydrocarbons appeared to be particularly suitable for the production of dilute solutions.

"The experiments have been successful in showing how formaldehyde can be made in the form of a dilute solution; they have not, however, led to important commercial results in view of the greater success of the manufacture of methyl alcohol from mixtures of carbon monoxide and hydrogen, which has been one of the causes of the reduction in the price of formaldehyde to its present value of £40 per ton. Nevertheless, the Board thinks it desirable to place all the data on record, particularly as useful information has been obtained in connection with the concentration of dilute formaldehyde solutions." Gaseous hydrocarbons of the aliphatic series have been suggested as raw materials (alternatively to methyl alcohol) for the commercial production of formaldehyde, and numerous attempts have previously been made, on a laboratory scale, to control their oxidation, especially as regards methane and ethylene. When the oxidising agent is air, oxygen, or ozone, ethylene affords the easiest material for oxidation.

Natural Resources of Hydrocarbons

Within the Empire there are large natural sources of gaseous hydrocarbons consisting mainly of methane with a small percentage of hydrogen. In England itself the yield of natural gas is limited, but supplies are obtainable at Heathfield in Sussex and from the oil-borings at Hardstoft, Derbyshire. The gases formed in the fissures of coal seams constitute a natural source of methane. By sealing a section of a mine where the gases are copiously evolved, it is possible to collect a gaseous mixture containing more than 90 per cent. methane. The gas from a "blower" of Messrs. Insoles, of Porth, in Wales, is collected and compressed for transport.

Coal gas is a potential source of large supplies of methane, but as the hydrocarbon is present at a concentration of only about 33 per cent. by volume and occurs together with carbon monoxide, carbon dioxide, hydrogen, etc., complications arise in any oxidation process involving its use. Ethylene, which is present to the extent of 3–4 per cent., is a useful constituent from the point of view of formaldehyde production. Low temperature carbonisation also holds out possibilities in methane and ethylene production, while methane is produced by the action of bacteria on sewage, straw, etc.

Oxidation of Ethylene by Air

In an industrial process for the production of formaldehyde by the controlled oxidation of ethylene, it would be necessary to employ a circulatory system, since it is unlikely that ethylene would become available in sufficient quantities for use in a direct process. In order to regulate the uniformity of the circulating gases and to ensure the presence of ethylene and oxygen in the requisite quantities, a systematic procedure for the introduction of ethylene and air and the withdrawal of the gaseous products of reaction is essential. The following table, based on laboratory experiments, indicates the quantities and conditions for the production of 1 ton of formalin (40 per cent.) in 24 hours.

PRODUCTION OF FORMALIN BY OXIDATION OF ETHYLENE.

Capacity of Plant (circulatory system)	=	30,000 cu. ft.
Initial Composition of Circulating Gas—		
Ethylene	=	15 per cent.
Oxygen	=	17 per cent.
Nitrogen	=	68 per cent.
Linear Velocity of Gas	=	3·5 m. per sec.
Cubic Velocity of Gas	=	6,000 cu. ft. per min.
Temperature of Furnace	=	600° C.
Time of Heating per Passage	=	1 sec.
Time per Circulation	=	5 min.
Formaldehyde on Ethylene consumed	=	50 per cent.
Carbon Monoxide on Ethylene consumed	=	25 per cent.
Methane (or thermal decomposition products) on Ethylene consumed	=	25 per cent.
Concentration of Formaldehyde in Gases leaving Reaction Zone	=	2 mg. per litre.
Vapour Pressure of Formaldehyde	=	1·2 mm. Hg.
Volume of Ethylene required per 24 hrs.	=	67,000 cu. ft.

The authors of the monograph show a suggested plant for the oxidation of ethylene as in the above table. The estimated

capital outlay would be £25,000. Excluding the cost of ethylene, it should be possible to produce 1 ton of formalin (40 per cent. formaldehyde) per day for about £24 10s. Recent developments in the production of synthetic methyl alcohol render an outlay of £25,000 doubtful.

An estimate, similar to the above, is given for the production of formalin from ethylene and ozone. In this case, ignoring the price of ethylene, the cost of formalin produced on a one ton per day basis would be £32 10s., the cost of the suggested plant being about £9,500. The interaction of coal-gas or coke-oven gas with ozone is also considered. In this case the capital outlay for the plant, exclusive of the ozone generator, would be £6,500, and the daily charge for one ton of formalin £70. "It is obvious," states the monograph, "that, on account of the high cost of production of ozone, the manufacture of formaldehyde by an ozonisation process could not hope to compete with the present methods, whereby formalin is placed on the market at £40 per ton ex wharf (April, 1926). However, in emergency, especially with increased efficiency of ozone production and reduced cost of power, this process may be worth consideration."

As regards the interaction of methane and oxygen for the production of formaldehyde, it appears, from the results obtained in the investigations, that the method could only be considered as an economical proposition if methane were obtainable at a low or even nominal cost.

Concentration of Dilute Formaldehyde Solutions

Valuable results were obtained in the course of the investigation as regards the concentration of dilute formaldehyde solutions. From the data derived from the laboratory and semi-technical distillation of dilute formaldehyde solutions under pressure, it has been possible to arrive at a systematic procedure whereby concentration to approximately 40 per cent. strength can be effected, involving a minimum of loss due to decomposition and the discarding of the very dilute residues.

It appears that the cost of concentration on a commercial scale under a pressure of 60 lb. per sq. in. would be almost inversely proportional to the initial concentration of the solution. Thus, whilst the estimated cost per ton of 40 per cent. formaldehyde derived from a 1·5 per cent. solution would be about £24, the corresponding figure for the distillation of a 5 per cent. solution would be only £6. Since the cost per ton of 40 per cent. formalin obtained by the concentration of a 1 per cent. solution is approximately £36, it is apparently uneconomical to concentrate by distillation a solution appreciably weaker than 1·5 per cent.

The action of metals on formaldehyde solutions at 155° C. was investigated. The metals tested were nickel, aluminium, copper, iron, and Monel metal, strips being heated for several hours with a definite volume of 10 per cent. formaldehyde solution in a glass bomb-tube. Under these conditions, the first three metals caused only slight decomposition, whilst the two last, especially iron, proved very reactive towards formaldehyde. The Monel metal, although containing only 9 per cent. of iron, had nevertheless a distinctly deleterious effect. It would thus be advisable to preclude iron in any form from a still designed for the distillation of formaldehyde solutions.

"Containers on Loan and Returnable"

THERE are some products (the British Chemical and Dyestuffs Traders' Association states) liable to key industry duty which, owing to their character, require a special and costly kind of container. In these cases it is the custom of the trade, both in buying and in selling, for the containers to be either "loaned by the seller and returnable" or to be supplied by the buyer, generally the former. For over five years Customs have accepted the "naked" value of such products when assessing the value for duty purposes, but recently the department issued an order to the effect that in future importers would have to pay key industry duty on "the cost to the importer of returning the containers when empty." The Association are opposing this new idea and have had discussions with the officials of the department. A detailed statement has also been submitted which the Commissioners are now considering. Should it be necessary, the question of taking this important point before the Referee will be considered.

The Testing of Blood

Papers before the Society of Public Analysts

AN ordinary meeting of the Society of Public Analysts was held in the theatre of the Institute of Pathology and Research, St. Mary's Hospital, London, Mr. E. Richards Bolton, president, being in the chair.

Certificates were read for the first time in favour of Messrs. A. H. Bateman, B.Sc., A.I.C.; A. O. Blackhurst, M.D.; W. Clayton, D.Sc., F.I.C.; C. W. Cornwell, B.Sc., A.I.C.; and Thomas Riley, A.I.C. Certificates were read for the second time in favour of Messrs. L. V. Cocks, A.I.C.; F. Dixon, B.Sc., A.I.C.; D. M. Freeland, A.I.C.; D. Geoghegan; C. G. Hyde, A.R.C.Sc., F.I.C.; V. J. Tilley, F.I.C.; L. Wild, B.Sc.; and H. A. Williams. The following were elected members of the Society: Messrs. C. E. Corfield, B.Sc., F.I.C.; H. E. C. Powers, B.Sc., A.I.C.; J. D. Rogers; and A. Samson, A.R.C.Sc., A.I.C.

The Biological, Precipitin, and Blood Grouping Tests

"The Biological Tests for Blood" were discussed by Sir William Willcox. An outline was given of the evolution of blood tests, from the days when the only differential method available was based on differences in the form and size of the blood corpuscles, down to the refined serum tests of the present time. The author described his technique for examining blood stains, and illustrated his method of filtering the stain extract before applying the serum tests. He advised great caution in using bought specific sera for these tests, since they were frequently inert.

Dr. G. Roche Lynch followed with a paper on "The Technique of the Precipitin Test and its Forensic Value." After a summary of the theory of the formation of antigens in the blood of a living animal, and an account of the properties of anti-bodies, the author described the various methods of preparing anti-sera, the extraction of blood stains, the filtration and sterilisation of the extract by means of special apparatus, the methods of determining the concentration of the extract, and the various ways in which the precipitin test could be applied. The precautions required and the limitations of the test were discussed and various possible applications of the serum test in the examination of foods were given.

Finally, Dr. F. C. Martley dealt with "The Use of the Blood Grouping Reactions in Forensic Investigation." The theory and technique of blood agglutination tests were discussed and demonstrated, and the author showed how, by means of the four blood groups in which the blood of different individuals could be classed, it was often possible to distinguish between the blood of different persons. Various applications of the method in forensic work were pointed out.

Meeting of Society of Glass Technology

THE opening meeting of the Society of Glass Technology for the Session 1927-28 was held in Sheffield on Wednesday, October 19, the president, Mr. Walter Butterworth, senr., in the chair. Following an introductory address by the president, two papers were presented: "Opal Glass. Crystal Growth and Impact Brittleness," by J. F. Hyslop, B.Sc. (A communication from the research laboratories of the General Electric Co., Ltd.); and "The Detection of Selenium in Decolourised Bottle Glass," by E. J. C. Bowmaker, B.Sc., and J. D. Canwood, M.Sc. The procedure for the detection of selenium consisted in treating 2 to 3 grams of glass in a platinum vessel with 15 to 20 cc. of hydrofluoric acid and 2 cc. of strong nitric acid, and evaporating to dryness at about 90° C. To the residue, 4 to 5 cc. of strong nitric acid were added and the solution again evaporated to dryness. The residue was then dissolved with 5 cc. of 1:1 nitric acid and a little water added to the solution. 10 cc. of strong sulphuric acid were added and the whole evaporated until fuming for a few minutes. The solution was allowed to become quite cold, when a piece of codeine sulphate, about the size of a pin's head, was added and stirred until dissolved. The solution was then heated to the fuming point when a green coloration denoted the presence of selenium. Manganese and copper must be absent. The third paper on the agenda, namely, "The Birmingham Glass Trade, 1740 to 1835," by Francis Buckley, was taken as read.

Oil and Colour Chemists' Meeting

Papers by Professors Lowry and Dr. Fox

THERE was a meeting of the Oil and Colour Chemists' Association at the Institute of Chemistry, London, on Tuesday, the president, Dr. C. A. Klein, taking the chair.

The first paper, "The Scattering of Light by Graded Particles in Suspension," by Professor T. M. Lowry and Mr. M. C. Marsh, was read by Professor Lowry. A sample of ground barytes was separated in 13 fractions by elutriation at water-velocities of 0·5 to 12·5 mm. per second. The diameters of the particles were measured and used to test the validity of Stokes' law, as applied to crystalline particles of barytes. The various fractions were suspended in medicinal paraffin and the light-transmission was measured. The optical density was proportional to the surface-concentration of the powder, but increased slowly as the diameter was reduced to 50μ, and much more rapidly when the diameter was reduced below 30μ. The probable existence of a maximum degree of covering-power on further subdivision was indicated.

Discussion

Dr. C. A. Klein commented upon the fact that Cambridge had turned out a paper with a definite technical bias. The older universities, he said, were now beginning to play their part in industry, and industry should encourage those universities in that direction. Those with a technical bias did not consider that to deal with technical problems involved a lowering of dignity, or that their problems were less difficult than those which pure scientists engaged in, and he would be glad to see something done in the industry to further technical investigations, particularly in the older universities.

Professor Lowry, replying, said that in his laboratory there were twenty-four people doing research work in physical chemistry, but Mr. Marsh was the only one in the last two years who was willing to tackle an industrial problem. He would be glad to carry his experiments further, but it was difficult to find hands to do it.

Delayed Precipitation in Dilute Solutions

Dr. Fox, reading a paper on the above subject, uttered a warning to colour chemists in regard to the delay in complete precipitation from dilute solutions. It was well known, he said, that in ordinary analytical operations the formation of the precipitate was by no means instantaneous, and this applied particularly to very dilute solutions. It was not too clearly recognised that in dealing with the determination of very small quantities of substances which had to be determined with some accuracy, whether colorimetrically or by precipitation, the reaction used for the determinations might not be complete for a long time. One could not get round this by assuming that the precipitate measured after a short interval against a standard was a true measure of the actual amount of material being dealt with. He gave a number of examples to illustrate his point, and said that in some cases complete precipitation was not attained until something like twenty-four hours had elapsed. One case with which he had been concerned particularly was that of minute quantities of zinc to the order of one-tenth mg. in something like 100 c.c. of liquid. He supposed one of the best methods was precipitation by means of ferro-cyanide. That precipitation with a large excess of ferro-cyanide was complete in an hour, but not in ten minutes. In a laboratory one was likely to take a zinc solution, put in the ferro-cyanide, and take a reading in ten minutes, and that reading was entirely fallacious.

Apparatus for Determining Particle Size in Ground Pigments

Lieut.-Colonel J. V. Ramsden (Malehurst Barytes Co., Ltd.) demonstrated an apparatus for the edtermination of particle size in ground pigments which he had developed in the course of his work on barytes grinding, and which was in daily use in the works of his company. The method was to mix a small quantity of the powder with water until a very slight turbidity was attained. The mixture, after shaking in a test tube, was poured into a transparent-bottomed dish made of xylonite. The dish was placed on the stage of an inverted microscope specially designed for this work, and by means of a quarter-inch objective the images of the particles lying on the bottom of the tray were projected on to a ground glass screen, on which were ruled lines. These lines were set apart by a distance corresponding to the mesh which the particles must pass through to be satisfactory. Should a particle be larger than the distance between two lines, the material was condemned. By the use of suitably calibrated screens, particles could be directly measured, without fatigue to the eye. This special microscope was also adaptable to the examination of metallurgical specimens and other opaque bodies. The instrument permitted of the instant substitution of a photographic plate for the screen, so that records of any sample were easily obtained. The instrument was built on novel lines to withstand the hard use of industrial inspection and at the same time preserve definite alignment. For this purpose all motions were modelled on the Kelvin slide system.

Registration and the Title "Chemist"

To the Editor of THE CHEMICAL AGE.

SIR,—The report of the Registration Committee of the British Association of Chemists has now been published in the "Chemical Practitioner," and it may be of interest shortly to discuss the reasons which have caused the Committee to employ the term the "Register of Chemical Practitioners."

Besides not wishing to encroach upon any legal right possessed by the pharmacists, the Council and Committee are, at least, doubtful if it is in the best interests of the profession of chemistry officially to employ the title "Chemist." Even in the minds of the best instructed section of the public it has become associated with pharmacy and to eradicate that impression, having regard to its traditional and legal associations, even if justified, will be exceedingly difficult. This does not necessarily mean, however, that the name, as a matter of courtesy, cannot be employed as heretofore. Strictly no physician without a doctor's degree has any right to describe himself as a doctor, but custom freely permits the use of the title. If it were employed officially, however, a great deal of confusion would result. Without being exact, the analogy is sufficiently close for practical illustration, and the new *official* title suggested by the Committee seems admirably suited to overcome a difficulty which has appeared to some a real obstacle to recognised legal status. Copies of the "Chemical Practitioner" containing the report can be obtained from the Registered Office of the Association, "Empire House," 175, Piccadilly, London, W.1, price 6d. post free.—Yours, etc.,

HENRY T. F. RHODES,
General Secretary.

BRITISH ASSOCIATION OF CHEMISTS.
"Empire House,"
175, Piccadilly, London, W.1.

Key Industry Duties

Renewals of Exemption Orders

THE period of operation of the exemption orders issued during the past few months expires in March, 1928. It is important that all concerned should have early notice as to whether the Board of Trade intend to recommend the Treasury to renew these exemptions for a further period. On this point correspondence has taken place between the British Chemical and Dyestuffs Merchants' Association and the Board of Trade.

The Association wrote to the Board of Trade asking, with reference to the products liable to duty under Part I of the Safeguarding of Industries Act which have been exempted by Treasury Orders under Section 10 (5) of the Finance Act, 1926, if the Board had decided to recommend the Treasury to renew the orders for a further period. While it is appreciated that the Board are anxious to give every facility to manufacturers who may consider the question of producing these products, it is pointed out that the present indefinite state as to what will be the market condition only a few months ahead is proving very difficult to both buyer and seller, who, it is suggested, are entitled to some consideration. In order to disturb the markets as infrequently as possible, the period for which exemptions are granted or renewed should be much longer than has been the case in the past and a period of at least two years is suggested.

The Board of Trade in reply state that they are not in a position to make any announcement on this matter at present, but that in due course the position of each product will be investigated. The Board will bear in mind the desire to receive early notification, and they note the suggestion that the period of exemption orders should be longer than at present.

Reviews

PHOSPHORIC ACID, PHOSPHATES, AND PHOSPHATIC FERTILISERS. By W. H. Waggaman and H. W. Easterwood. Monograph Series, No. 34. New York: The Chemical Catalog Co., Inc. Pp. 370. $7.50.

This book is one of the Monograph Series of the American Chemical Society, and it serves two distinct purposes. It presents the knowledge available on the subject in question in a readable form, intelligible to those whose activities may be along a wholly different line, and it promotes research in the branch of science covered, by providing a well-digested survey of the progress made, and by pointing out the signposts that further extended investigation should follow. The authors are well known, not only because of their association with the Bureau of Soils, United States Department of Agriculture, but by reason of their many contributions during the last few years to the technical press.

The book is divided into ten chapters, together with an appendix of real value. The chemistry of elemental phosphorus, oxides of phosphorus, and the acids of phosphorus is treated in some detail, and several pages are set apart to the sources of phosphoric acid, and their classification. The information amassed is both comprehensive and up to date.

The manufacture of calcium superphosphate and the unit processes involved are dealt with in Chapter V, and cover 46 pages. The treatment is thorough, and current practice is discussed in some detail. Double superphosphate, which is of peculiar interest in these days, when an attempt is made to concentrate the essential constituent of a fertiliser in order to reduce carriage and freightage charges, is dealt with concisely, and reference is made both to the sulphuric acid and pyrolytic processes, but no indication appears to be given as to which is the better method from the economic point of view.

When diammonium phosphate is assuming so much importance by reason of its manufacture by the Liljenroth process, it is interesting to observe that pure diammonium phosphate is not as simply produced from strong acid as the mono salt, since in passing ammonia into concentrated phosphoric acid, the heat of the reaction is such that the solution will no longer take up ammonia gas when a point is reached midway between mono and diammonium phosphates. Apparently, if the solution is cooled at this point, the whole mass solidifies, which also prevents the absorption of sufficient ammonia to convert the product completely to the di salt.

On the subject of the Liljenroth process, singularly little comment is made, but what is remarked is interesting and pertinent. The European rights of the Liljenroth process have been acquired by the Badische Anilin und Soda Fabrik, which is erecting large plant on the Elbe River, Germany. While the possibility of this process is said to have been proven with a small plant at Niagara Falls, the experience of the authors has been that the complete collection of phosphorus requires an elaborate condensing system, which would add appreciably to the cost of the final product. Moreover, the ease with which most catalysts are poisoned makes it seem doubtful complete oxidation of the phosphorus vapours can be attained by treating them with steam, unless special precautions are taken to prevent contamination of the catalytic agent. Direct oxidisation of phosphorus by air as the vapours issue from the furnace, appears to be a much simpler scheme, even though no valuable by-product is obtained. The information collated on the subject of the volatilisation process for producing phosphoric acid is very complete, and constitutes a valuable contribution to our knowledge of the subject.

The appendix is peculiarly valuable, summarising, as it does, the various patents relating to the production of soluble and available phosphates, and phosphorus and phosphoric acid. The book is well printed and contains many illustrations; the information is sound and up to date, and the volume can be recommended with confidence to those who are interested in phosphatic fertilisers. P. PARRISH.

HANDBOOK OF PHOTO-MICROGRAPHY. By H. Lloyd Hind, B.Sc., F.I.C., and W. Brough Randles, B.Sc. Second Edition. London: George Routledge and Sons, Ltd. Pp. 295 and 44 Plates. 16s.

It is difficult, in any book on applied microscopy, to introduce really new matter, as no appliance or method embodying any new principle has been evolved for long past. In photo-micrography with visual light this is certainly so, and the authors in the book under review have been compelled to confine themselves to orthodox and well-known methods. They have, however, done this with a considerable measure of success. Reliance has been placed in large part on illustrations, full description being given of the methods employed in their production. The essence of all such work is illumination, and to the proper carrying out of this part of the process the writers prefer to use the term "critical illumination." They still suggest that this condition can be best secured by having an image of the radiant focused in the plane of the object by any suitable sub-stage condenser, although it is probable that the particular position of the image of the radiant has little to do with the result. They do, however, describe a series of simple experiments by which a beginner may learn much about illumination, and this is certainly a commendable feature of the book. The illustrations are good, well selected, and excellently reproduced. They, in themselves, will prove of educative value to any reader. J. E. B.

ALLEN'S COMMERCIAL ORGANIC ANALYSIS, Vol. V. London: J. and A. Churchill. Pp. 700. 30s.

This volume deals with the analysis of tannins, leather, writing, typing, printing, marking and stamping inks; amines and ammonium bases; colouring matters (natural and those used in foods); benzene and its homologues; aniline, naphthylamines, pyridine and other bases. The section on tannins has been written by Dr. M. Nierenstein in a very thorough and scientific manner. The description is detailed but nevertheless very readable. Apart from the official methods, numerous other procedures are discussed. Unfortunately, the same cannot be said about all sections. The section on printing inks is far too short (22 pages) for such an important and difficult subject. In the section on benzene, etc., the important publications dealing with the analysis of benzene, toluene, and xylene, which have been published in Britain since 1914, have been somewhat neglected, and many of the methods representing modern British practice are not given. The volume is well printed, but we notice a few errors:—On page 513 "Fawsilt" should read "Fawsitt"; p. 517 "Deningès" should read "Denigès"; p. 516, the formula $C_2H_3S.SO_3H$ should read $C_4H_3S.SO_3H$ and $C_2H_2S.COOH$ should read $C_4H_3S.COOH$. S. P. S.

CASEIN: ITS PREPARATION, CHEMISTRY AND TECHNICAL UTILISATION. By E. L. Tague, Ph.D. London: Constable and Co. Pp. 218. 17s.

In spite of the vast amount of research which has been carried out on casein, and the great variety of its technical applications, we are still a very long way from anything approaching a complete knowledge of its chemical and physico-chemical properties, and its colloidal character makes it one of a large group of substances in regard to which our point of view is likely to undergo marked changes with the advance of physical chemistry. In the volume under review, the author has based his treatment on the principles of colloid chemistry. In various chapters he deals with the preparation, chemistry, compounds, and decomposition products of casein, and with paracasein. In the last two chapters, the technical preparation and uses of the substance are discussed at length, the former containing an account of casein machinery. The value of the book is enhanced by a list of abstracts of the more important patents dealing with the preparation, uses, and applications of casein, and by a bibliography of its literature. F.

VAN NOSTRAND'S CHEMICAL ANNUAL. SIXTH ISSUE, 1926. Edited by John C. Olsen. London: Chapman and Hall. Pp. 882. 21s.

A number of new tables have been added to this edition, including tables on isotopes, hydrogen ion concentrations and hydrogen values, specific gravity and solubilities, isoelectric points of proteins, and pressure of aqueous vapour of hydrated salt systems, as well as comprehensive tables of the physical properties of lead and mercury. A valuable feature is the list of new books, these being the more important works which have been published since 1921, including those published in England, the United States, France, and Germany. Very few of the older tables have been eliminated, and the high standard of the former editions is retained.

Chemical and Metallurgical Corporation

Share Issue Approved

An extraordinary general meeting of the Chemical and Metallurgical Corporation, Ltd., was held on Monday in London. Sir Frederick Mills said that they had decided to install at a suitable location an electrolytic zinc refinery, so that they could deal with lead and zinc from the raw material to their conversion into metal or into any form of zinc or lead compound. They had on the board directors who were closely associated with the operation of zinc-lead mines in Mexico and other parts of the world. The products from these mines were to-day going to the Continent of Europe for subsequent treatment, and these gentlemen and their associate directors had been studying the question of erecting at some point in Europe where power could be secured at a low cost an electrolytic zinc refinery of their own, and diverting to this refinery the ores from the mines which they controlled rather than ship them to Europe for treatment. They decided, however, as they were practically dominant shareholders of the company, to propose to the board, rather than erect such a plant themselves, that they should submit a proposal that this refinery should be erected and operated by the corporation. They offered to provide all the capital for the erection of such a plant. The board had decided to accept their suggestions, and it was because of their decision to proceed with the erection of an electrolytic zinc refinery that they had felt it necessary to ask the shareholders to deal with the entire unissued share capital of the company as and when they decided so to proceed, and to issue it at the best price which could be secured. The first resolution to be submitted dealt with the authority of the board to dispose of the share capital of the company in excess of 5,000,000 shares. The board had contracted to dispose of a considerable portion of the balance of the authorised capital, and they asked for the shareholders' authority to deal with it. They would require very substantial funds for the purchase of ores in the market, and they had agreed to sell a large block of the unissued shares to an important financial group. They were also asking the shareholders to authorise a resolution for an increase in the number of directors from eight to twelve. The resolutions submitted were carried unanimously.

Claim Against a Chemical Company Fails

In the Manchester Chancery Court on Monday, the Vice-Chancellor, Mr. G. Courthorpe Wilson, delivered judgment in an action against the Harding Chemical Co., Ltd., of Manchester, brought by James Frederick Moseley, of Fallowfield, Manchester, for the purpose of restraining the defendants from manufacturing and selling a product used in laundries and for scouring, bleaching, and other purposes in the textile industries, under a process patented by the plaintiff. According to the evidence, plaintiff, in October, 1923, granted the company the sole rights to manufacture and sell in the United Kingdom in accordance with his process, the defendants undertaking to pay him four per cent. on all sales. In December, 1923, plaintiff was appointed a director of the company and was also technical consultant and manager, but in December of the following year he was dismissed. It was stated that through expensive advertising and the employment of additional salesmen the defendants at that time had lost money on the product. The plaintiff subsequently brought an action against the defendants for selling the product under the name of "Viscoid." By reason of the company having broken the agreement with him, plaintiff now claimed that he was entitled to terminate the agreement. He wished, he said, to grant the sole manufacturing and selling rights under the process to another Manchester firm in which he and his brother were the principal shareholders. The Vice-Chancellor, in the course of his judgment, said there had been a breach of the agreement by the defendants selling the product under another name but in respect of that matter, when by consent an order was made against the company, plaintiff waived his right to terminate the agreement. No proof had been given of any other breach which entitled him to take away the rights he had granted to the defendants, and the action, therefore, failed and would be dismissed with costs.

Wetting-out Agents

Dr. Rath's Paper to Dyers and Colourists

At a meeting of the Manchester Section of the Society of Dyers and Colourists on Monday, a paper on "Wetting-out Agents and Other Auxiliary Products Used in Dyeing and Calico Printing" was read by Dr. Rath.

Dr. Rath said that in the manufacture of textiles many of the difficulties which confronted the dyer, printer, or finisher had been met by mechanical means, but, although textile machinery had been brought to a high state of perfection, other difficulties remained which were primarily chemical problems, and the chemical industry had sought to overcome these by the creation of suitable auxiliaries. The Nekals were coal-tar derivatives possessing, though in a much higher degree, some of the valuable properties of soap and turkey red oil, notably great wetting-out, emulsifying, and dissolving power.

It was well known that the levelness, penetration, and to some extent the permanency of shades dyed or printed on cloth depended to a great extent upon the thorough wetting-out of the material. As wetting-out agents the Nekals were of the greatest value, and in many cases they made it practicable to dispense with the previous boiling out of the goods. In vat dyeing the Nekals had been used with conspicuous success. The addition of Nekal brought about a reduction of the surface tension, which caused the oxidised dyestuff to sink and become reduced again, so that the surface of the dye liquor was free from scum. Another brand of Nekal had extraordinary emulsifying power, and stable emulsions were produced with oils, fats, and waxes which served for scrooping, sizing, and finishing. Another ready prepared emulsion was used for waterproofing in a simple one-bath process without the use of inflammable solvents.

The Leonils were products possessing a somewhat similar chemical constitution to the Nekals, and were specially recommended for the treatment of wool. In wool scouring the quantity of alkali might be reduced by one-half with Leonil as an assistant. The Nekals and Leonils were useful additions to dyebaths in order to obtain improved penetration of the material.

Safeguarding of Key Industries

Calcium Biphosphate Inquiry

The Board of Trade have received a complaint under Section 1 (5) of the Safeguarding of Industries Act, 1921, that calcium biphosphate (baking powder quality) has been improperly excluded from the list, H ii, of articles chargeable with duty under Part I of that Act, as amended by Section 10 of the Finance Act, 1926. The complaint will be referred for arbitration to a tribunal constituted under Section 10 (4) of the Finance Act, 1926, and the date of the hearing will be announced shortly. Any communications should be addressed without delay to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1.

Royal Society Medal Awards

The following are among the awards of Royal Society medals by the president and council this year:—

A Royal Medal to Professor J. C. McLennan (of Canada), for his researches in spectroscopy and atomic physics.

The Davy Medal to Professor A. A. Noyes (of the United States), for his work in physical chemistry, especially on the subject of electrolytic solutions.

The Hughes Medal to Dr. William D. Coolidge (of the United States), for his work on the X-rays and the development of highly efficient apparatus for their production.

Institute of Chemistry: London Section's Annual Meeting

The annual meeting of the London and South-Eastern Counties Section of the Institute of Chemistry will be held at 30, Russell Square, on Wednesday, November 16, at 8 p.m. Officers and members of the committee will be elected. The business of the meeting will be followed by a smoking concert, which will commence between 8.15 and 8.30 p.m.

Demonstration in Fireproofing Products

Interesting Results

A VERY interesting series of demonstrations of the fire-resisting properties of "Colardo" universal fireproof paint and impregnating medium has just been given in the grounds of the Alexandra Palace, London. Among those present were representatives of the Army and Aircraft Boards, the India Office, the railways, the National Fire Brigade Association, etc. The first test was a demonstration of the remarkable properties of "Colardo" colourless impregnating liquid. An ordinary blow-lamp was placed in the middle of a heap of wood-wool which had been treated with the impregnating fluid, the wood-wool being perfectly dry at the time of the test. The fierce flame of the blow-lamp was allowed to play in the wood-wool for about ten minutes. The wood-wool charred where it came into contact with the flame, but there were no signs of smouldering or incandescence. In the second test, a sheet of linen, which had been treated with the impregnating medium, was subjected to the flame of a blow-lamp for about five minutes. Here again that part of the material in direct contact with the flame became charred, but the surrounding material was unaffected. Similar results were obtained with a sheet of white cartridge paper, which had been painted both sides with one coat of "Colardo" fireproof paint. The *pièce de résistance* of the demonstration was shown in the form of two huts built of ¾-in. timber. One of these was in plain whitewood and the other had been painted with two coats of green "Colardo" paint. Within each hut was placed a tier of square frames made of plain whitewood with air spaces between the frames, and these were stuffed with dry wood-wool and soaked with petrol. A flame was applied to the inflammable material in each hut, which immediately took fire. The unpainted hut was completely demolished by fire in about half an hour. As regards the painted hut, it was seen that the covering of green paint was absolutely impervious to the fierce flames which were attacking it from within, and there was no sign of the main structure catching fire. At the expiration of half an hour the inflammable material inside this hut had completely burned away. The majority of the boards were unaffected, and those boards which had been subjected to direct contact with the fierce flames for 30 minutes were merely charred. There was no sign of incandescence and, in spite of a strong wind blowing at the time, there was no indication of smouldering. The blackened portions of wood were scraped away with a knife and one of the boards was broken across the middle, when it was seen that the charring had gone to a depth of about a quarter of an inch, and beneath this the wood was white and unaffected. In addition to the above paint, etc., a "Colardo" fireproof varnish is available. Further particulars of these fireproofing products may be had of Amalgamated Processes, Ltd., of 3, Grosvenor Gardens, London, S.W.1.

Composition of Cracked Spirits

ON Tuesday, before the Institution of Petroleum Technologists, Professor J. S. S. Brame and Mr. T. G. Hunter read a paper on the "Composition of Cracked Distillates." They pointed out that although the physical and engineering side of the cracking process had developed rapidly within the last few years, the chemical nature of the product had only been partially investigated. The first part of the paper was devoted to the investigation of the methods of separating unsaturated and aromatic hydrocarbons from the saturated paraffins and naphthenes, and the much more difficult problem of finding some method applicable to the separation of these two latter classes. Whilst that problem has not been solved completely, a method of obtaining a reasonably high degree of separation had been developed, and it was felt that the methods were sufficiently perfected to warrant their application to a commercial cracked spirit obtained from Russian kerosine in a Cross cracking plant. Details were given of the investigation of the fraction of this cracked spirit boiling below 120° C. Saturated hydrocarbons present included trimethylethylmethane; di-isopropyl; *n*-hexane; *n*-heptane; methylpentamethylene; dimethylpentamethylene; hexamethylene; and methylhexamethylene. Of the unsaturated hydrocarbons present, 3-methylpentene, 2-methylpentene, and 5-methylhexane were identified.

Chemical Matters in Parliament

Russian Purchases of Nitrate

IN answer to questions from Sir J. Davidson and Sir W. Davison (House of Commons, November 8), the Secretary of State for War, Sir Laming Worthington-Evans, said that he believed it was true that the Russian Government had purchased 50,000 tons of nitrate, presumably for munition purposes. He had also received information that the Russian Government had purchased large quantities of leather and tanning material, and also lead, copper, and tungsten. All of these supplies could be used for civil or military purposes. The nitrate was bought in Chile.

Beet Sugar Subsidy

Mr. Guinness stated, in a written reply to a question by Sir F. Wise (House of Commons, November 8), that in accordance with the provisions of the British Sugar (Subsidy) Act, the amount of subsidy paid to manufacturers from April 1, 1927, to November 5, 1927, was £744,148 18s. 2d.

Jubilee Celebrations of the Institute

THE arrangements so far determined for the jubilee celebration which will be held in London, under the patronage of H.R.H the Prince of Wales, on December 14 and 15, are as follows:—On Wednesday, December 14, at 8 p.m., a conversazione will be held at the Wharncliffe Rooms, Hotel Great Central, Marylebone, London. Following a reception by the president and council at 8 p.m., a programme of music will be provided, and there will be dancing from 9.30 to 12. On Thursday, December 15, at a cinema in the West End of London, films will be shown illustrating British Industries in which Chemistry is applied. Also on Thursday, December 15, the Institute jubilee dinner, to which a company of distinguished guests has been invited, will be held at the Wharncliffe Rooms, Hotel Great Central, at 7 for 7.30 p.m., the president in the chair. The jubilee dinner for this year will take the place of the Annual Chemical Dinner. Tickets will cost 10s. 6d. The accommodation is limited to 520.

Nitrate Industry Propaganda

A RADICAL change in the nature of propaganda is foreshadowed by a recent decision of the Nitrate Producers' Association. The Chilean Nitrate Committee, as at present constituted, has been abolished, and the propaganda (except in North and South America) is to be centralised under a director-general resident in London, who will appoint consultative committees in the various consuming countries to study the best form of propaganda in each country, and to watch the efforts of competitive articles. In their current circular, Aikman (London), Ltd., comment on the latest Chilean budget figures in the light of a prospective reduction in the nitrate duty. If the estimates prove correct, the Chilean budget surplus for 1928 might reach £1,375,000, and make a reduction in duty after June 30, 1928, possible without seriously affecting the budget.

Norsk Hydro Sanction Co-operation with the I.G.

THE plan for mutual co-operation between the I.G. Farbenindustrie and the Norwegian Hydro-Elektrisk Koaelstof, in technical and sales departments, was confirmed at a general meeting of the latter company last week. The capital of the Norwegian concern is being raised by about £1,050,000 to £4,300,000, which will be brought about by an exchange of shares with the I.G. A mutual exchange of patents and technical processes was also decided upon, and the projected expansion of the Norwegian works was officially sanctioned, which will, upon completion of the plan, result in trebling the production of nitrogen compounds.

British Fair Progress

AN edition of 10,000 copies of the British Industries Fair catalogue, containing classified lists of exhibitors and index in nine languages, is being prepared by the Department of Overseas Trade for publication on New Year's Day, seven weeks before the opening of the Fair. "Several exhibitors obtained orders before the Fair opened this year as a result of the description of their exhibits or advertisements in the catalogue," an official states. "No other trade fair in the world has so full an advance edition ready so early."

From Week to Week

A REDUCTION IN THE DUTY on phenol has been recommended by the U.S. Tariff Commission.

THE SALAR DEL CARMEN NITRATE SYNDICATE expects to open its oficina at the end of the present month.

SHAREHOLDERS OF THE CANADA CEMENT CO., at a special meeting in Montreal, approved the sale of the company's assets to Wood, Gundy and Co., Ltd., who are paying a total of $46,875,000 for the concern.

THE NEW PACCHA AND JAZPAMPA NITRATE CO. announce that instructions have been given to reopen oficina Jazpampa and it is expected that the manufacture of nitrate will commence before the end of the year.

PROFESSOR W. A. BONE, F.R.S., will deliver a lecture entitled "Gaseous Combustion at High Pressures" in the rooms of the Chemical Society, Burlington House, London, on Thursday, November 24, at 8 p.m.

THE SCOTTISH SPITZBERGEN SYNDICATE state that the company's title to territory claimed, extending to 70,000 acres, is now assured. The properties are known to contain large beds of high quality gypsum and extensive deposits of coal.

AN INVESTIGATION into the present position of the sugar refining industry forms the subject of an application to the Government by the Greenock Chamber of Commerce, in which it is supported by the Association of British Chambers of Commerce.

THE RUSSIAN COMPANY Promexport (Industrial Export Co.) has organised the export of valuable ores and rare elements. A large quantity of chromium ore has been sold to various German metal works. A first consignment of 500 tons left Leningrad at the beginning of September.

A JOINT MEETING of the Edinburgh and East of Scotland Sections of the Institute of Chemistry and the Society of Chemical Industry was held last week in Edinburgh, when the inaugural address of the session was given by Mr. J. Adam Watson, F.I.C., technical adviser to the North British Rubber Co.

THE KOHLENCHEMIE A.-G. has been formed in Essen, with a capital of 500,000 Reichsmarks, to work in co-operation with the A.-G. für Kohleverwertung. The object of the new company is to convert purely chemical by-products to profitable account, and generally to look after the chemical interests of the Ruhr mines.

SERIOUS FACIAL INJURIES were received on Thursday, November 3, by Ernest Williams, a Birmingham student, as the result of the explosion of a quantity of sulphur, charcoal, and potassium nitrate which he was mixing with a pestle in a mortar. A portion of the mortar struck Williams and caused a lacerated wound, necessitating an operation.

MURPHY AND SON, LTD., of The Cedars Laboratories, Sheen Lane, Mortlake, London, S.W.14, have issued from their bureau of Bio-technology *Bulletins Nos. 15 and 16*, Vol. II (pp. 31, 3s.). The articles published include one on the use of carbolineum washes as horticultural insecticides, especially with regard to the wash known as "Mortegg" marketed by the company.

ARTIFICIAL SILK NEWS.—It was announced on Monday that Mr. G. S. Coats, of Paisley, had joined the board of Scottish Artificial Silks, Ltd., and that Mr. Seton V. Coats had been appointed general manager. Herr Ernst Wagner, late chief engineer to the Nuera Co., has been engaged as chief resident engineer. The Scottish Artificial Silks Co. is stated to be about to buy a mill at Lancaster for the spinning of artificial silk.

PROFESSOR F. C. LEA, D.Sc. of Sheffield University, addressed members of the Huddersfield Engineering Society on Monday night on the "Effect of Ordinary and High Temperatures on the Creeping of Metals." He said that attempts to discover smokeless fuel by carbonisation had forced experimenters to treat coal in vessels of metal, in which engineers had not full confidence, and described experiments which had been made to test the behaviour of metal at high temperatures.

PRESIDING AT A LUNCHEON given by the directors of the Mond Staffordshire Refining Co. at the Carlton Hotel, on Thursday, November 3, Sir Alfred Mond said attention had recently been turned to the application of chemical research to antiseptics. Prolonged experiment with regard to coal tar products had resulted in the production of an antiseptic, to which the name of "Monsol" had been given, which was of constant quality, could be taken internally or externally, and was a non-irritant.

THE COUNCIL OF THE BRITISH ASSOCIATION has decided to recommend the General Committee to apply for a Royal Charter for the Association. It was felt that the Association would be strengthened in its work by the possession of a charter, but the cost has hitherto been a deterrent. Mr. A. A. Campbell Swinton has now offered to bear the cost, and the Council has resolved to recommend the General Committee to accept his offer and to authorise the president and general officers of the Association to apply for a charter.

THE COMMERCIAL MOTOR TRANSPORT EXHIBITION will be held at Olympia, London, W., from November 17-26.

MR. FRANK WOKES, B.Sc., F.I.C., has been appointed assistant to Dr. J. H. Burn, Director of the Pharmacological Laboratories, 17, Bloomsbury Square, W.C.1.

MR. CARL W. TUCKER, formerly professor of analytical chemistry at Cornell University, has been appointed research chemist to the Roessler-Hasslacher Chemical Co., New York.

UNIVERSITY NEWS.—*Glasgow:* The Senate has approved the following for the degree of Ph.D. (in the Faculty of Science): Mr. J. A. J. Bennett, B.Sc., and Mr. T. C. Mitchell, B.Sc.

SIR FREDERICK MILLS has resumed personal control of the affairs of the Ebbw Vale Steel, Iron and Coal Co., Ltd., and has appointed Mr. Hubert McVicar and Mr. Robert Graham joint managers.

THE INQUEST on Arthur Dean, aged 24, who was crushed by a falling vat at the Dalton works of the British Dyestuffs Corporation, Ltd., on Saturday, November 5, and died immediately, was on Monday postponed until November 17.

THE NOBEL PRIZE for medicine and physiology for 1926 has been awarded to Professor Johannes Fibiger, of the University of Copenhagen. The prize for 1927 has been awarded to Professor Wagner von Jauregg, of the University of Vienna.

THE CONTRACT FOR DRILLING potash well No. 5, in the course of the U.S. Federal Government's effort to develop domestic potash supplies, has been awarded by the United States Bureau of Mines, Department of Commerce, to the Pennsylvania Drilling Co., Pittsburgh, Pa.

JUDGMENT WAS GIVEN for J. E. Evans-Jackson and Co., patent agents, Holborn Viaduct, E.C.1, in an action against Mr. A. Macbroome, Rowan Avenue, Whalley Range, Manchester, for £3 6s. 6d. for work done and money expended in the registration of a trade mark.

MR. WILLIAM RICHTER has been appointed general manager of the paint, lacquer and chemical department of E. I. du Pont de Nemours and Co., at Wilmington, in succession to Mr. William P. Allen, who has been granted leave of absence. Mr. J. W. Elms has been appointed assistant general manager.

THE STREATFIELD MEMORIAL LECTURE of the Institute of Chemistry will be delivered this year by Mr. O. F. Bloch, who will deal with "The Chemist in the Photographic Industry." The lecture will be held at the Royal Photographic Society, 35, Russell Square, London, on Friday, November 18, at 8 p.m.

IN CONNECTION WITH THE ELEVENTH ANNUAL CONGRESS of the Federation of Chambers of Commerce of the British Empire held in Cape Town, *The Cape Argus* published a special Empire Trade Supplement in which the trade of South Africa was reviewed, much space being devoted to mining and to the growing coal and iron industries. Copies of the supplement may be obtained gratis, from Argus South African Newspapers, Ltd., 72-78, Fleet Street, London, E.C.4.

THE DIRECTORS OF THE BUELL COMBUSTION CO. announce that negotiations have now been completed for the sale of the foreign rights of the Buell patents, the purchase consideration being a substantial sum in cash, and the retention of practically a half-interest in any profits obtained in any of the countries covered by the various patents. An agreement has also been entered into with powerful shipping interests whereby Buell apparatus will be put into operation on marine boilers.

THE PRIME MINISTER, during his speech at the Lord Mayor's banquet on Wednesday, made a complimentary reference to the I.C.I. labour scheme. He said that he was glad to see a conspicuous example of practical efforts to meet the aspirations of the work-people in the great industry which Sir Alfred Mond directed. He hoped that the example of the great combination would be widely adapted to the position of other industries, and that in all such schemes the co-operation and willing assent of the corresponding unions would be secured.

Obituary

MR. JAMES SIMPSON, for a long time associated with the Shettleston Oil and Chemical Co.

SIR WILLIAM GALLOWAY, the eminent mining engineer, on November 2, at Cardiff. He did much work on the cause and prevention of dust explosions in coal mines.

MR. REGINALD CHARLES PAKES, at 56, Rannock Road, London, W., on October 4, in his twenty-third year. Educated at Latymer Upper School and Chelsea Polytechnic, he graduated as B.Sc. with honours in chemistry, and since 1923 had been a member of the laboratory staff of J. Lyons and Co., Ltd., at Cadby Hall, Kensington.

MR. ARTHUR G. HENRY, formerly of the laboratory staff of the Ebbw Vale Steel, Iron and Coal Co., Ltd., in Chicago. A founder member of the American Society for Steel Treating, Mr. Henry was for many years chief research chemist of the Illinois Steel Co. and foundry chemist for the Featherstone Foundry and Machine Co., Chicago Mr. Henry was at one time a research chemist in the Ruhr Valley

References to Current Literature

British

ANALYSIS.—Determination of sulphur trioxide in the presence of sulphur dioxide, together with some analyses of commercial liquid dioxide. J. R. Eckman. *Chem. News*, November 4, pp. 299–300.

APPARATUS.—A rapid mercury still. R. J. Clark. *Proc. Cambridge Phil. Soc.*, October, pp. 956–958.

An apparatus for potentiometric titration. J. F. Spencer. *J.S.C.I.*, November 4, pp. 423–424 T.

GASEOUS COMBUSTION, ETC.—Further experiments on explosions in gaseous mixtures of acetylene, of hydrogen, and of pentane. A. Egerton and S. F. Gates. *Proc. Roy. Soc. A.*, November 1, pp. 516–529. Includes some experiments on the influence of lead tetraethyl on the rate of uniform movement of flame.

Gaseous combustion in electric discharges. II. The ignition of electrolytic gas by direct current discharges. G. I. Finch and L. G. Cowen. *Proc. Roy. Soc. A.*, November 1, pp. 529–539.

Gaseous combustion at high pressures. VIII. The explosion of methane with its own volume of oxygen at initial pressures up to 150 atmospheres. D. T. A. Towend. *Proc. Roy. Soc. A.*, November 1, pp. 637–663.

GENERAL.—Sorption of ammonia by glass (time, pressure, and temperature relationships). M. Francis and F. P. Burt. *Proc. Roy. Soc. A.*, November 1, pp. 586–602.

A convenient method of distillation of the alkali metals. R. J. Clark. *Proc. Cambridge Phil. Soc.*, October, pp. 953–955. Indicates a convenient method which may also be used to distil mercuric chloride, mercurous chloride, arsenic trioxide, etc., in order to free them from occluded gases and non-volatile impurities.

Caramel. H. Drake-Law. *J.S.C.I.*, November 4, p. 428 T.

The action of α-naphthol as a negative catalyst in the oxidation of drying oils. R. S. Morrell. *J. Oil and Colour Chem. Assoc.*, October, pp. 278–289.

United States

CATALYSIS.—The catalytic synthesis of water vapour in contact with metallic gold. A. F. Benton and J. C. Elgin. *J. Amer. Chem. Soc.*, October, pp, 2436–2438.

Germanium. XVIII. Further organic compounds of germanium. W. R. Orndorff, D. L. Tabern, and L. M. Dennis. *J. Amer. Chem. Soc.*, October, pp. 2512–2516.

GENERAL.—A graphical method of determining heat transfer in pipes. W. H. McAdams. *Chem. Met. Eng.*, October, pp. 599–600.

A semi-chemical pulping process. J. D. Rue, S. D. Wells, F. G. Rawlings, and J. A. Staidl. *Chem. Met. Eng.*, October, pp. 611–613.

Measurement of the adhesive strength of glue. C. E. Lanyon. *Chem. Met. Eng.*, October, pp. 1191–1193.

Absorption of nitrous oxides in an aqueous suspension of phosphate rock. V. N. Morris. *Ind. Eng. Chem.*, October 1, pp. 1143–1147. A comparison has been made of the absorption of nitrogen oxides with and without phosphate rock present, not only with water as the original absorbent, but with various solutions of nitric acid as well.

LOW-TEMPERATURE CARBONISATION.—Low-temperature carbonisation at Lakeside. R. P. Soule. *Combustion*, October, pp. 227–223. An account of the 200 ton per day McEwen-Runge plant at Lakeside, Milwaukee.

ORGANIC.—The reaction of para-substituted benzyl chlorides with sodium hydrogen sulphide. C. Barkenbus, E. B. Friedman, and R. K. Flege. *J. Amer. Chem. Soc.*, October, pp. 2549–2553.

Researches on quinazolines. XXXVIII. The synthesis of some new analogues of cinchophen and intermediate products. M. T. Bogert and E. M. McColm. *J. Amer. Chem. Soc.*, October, pp. 2650–2654.

Production of lactic acid by fermentation of wood sugar remaining after alcoholic fermentation. E. A. Marten, E. C. Sherrard, W. H. Peterson, and E. B. Fred. *Ind. Eng. Chem.*, October 1, pp. 1162–1165.

PHASE RULE.—Ternary systems. VI. Sodium carbonate, sodium bicarbonate, and water. A. E. Hill and L. R. Bacon. *J. Amer. Chem. Soc.*, October, pp. 2487–2495. The double salt "trona," $NaHCO_3$, Na_2CO_3, $2H_2O$, is stable in contact with saturated solutions from 21·26° C., the temperature of its formation, up to at least 50° C.

PLANT.—Stainless iron and its application to chemical plant construction. W. M. Mitchell. *Ind. Eng. Chem.* October 1, pp. 1171–1175.

RUBBER.—Isolation of the natural oxidation inhibitors of crude Hevea rubber. H. A. Bruson, L. B. Sebrell, and W. W. Vogt. *Ind. Eng. Chem.*, October 1, pp. 1187–1191.

German

ANALYSIS.—Colorimetric determination of *o*-dihydroxybenzenes. H. Schmalfusz, K. Spitzer, and H. Brandes. *Biochem. Zeitschrift*, October 7, pp. 226–228.

The gravimetric analysis of calcium. A. Franke and K. Dworzak. *Z. anal. Chem.*, Vol. 72, part 4, pp. 129–134.

COAL TAR.—New plant for the distillation of tar. O. L. Beer. *Die Metallbörse*. October 26, pp. 2385–2386; November 2, pp. 2442–2443.

CORROSION.—The resistance of some metals towards nitric acid. W. Schmidt. *Die Metallbörse*, October 29, pp. 2415–2416. The metals used were aluminium and its alloys, ferrochrome and chrome steels, chrome-nickel steels, and various other alloys.

GENERAL.—New views on the nature of the drying of fatty oils. J. Scheiber. *Z. angew. Chem.*, November 3, pp. 1279–1285.

The application of colloids to the prevention of boiler-scale formation. E. Sauer and F. Fischler. *Z. angew. Chem.*, October 20, pp. 1176–1183; November 3, pp. 1276–1279.

The chemistry of calcium cyanamide. II. The equilibrium of the reaction $CaC_2+N_2=CaCN_2+C$. H. Franck and H. Heimann. *Z. Elektrochem.* October, pp. 469–475.

Activated elements. H. Pincass. *Die Metallbörse*, November 2, pp. 2443–2445.

The significance of turpentine oil in chemical industry. M. J. Riemersma. *Chem. Zeit.*, October 26, pp. 823–825.

The preparation of salts of the noble metals for plating purposes. F. Chemnitius. *Chem.-Zeit.*, October 26, p. 823.

INORGANIC.—Sodium sulphide. II. P. P. Budnikoff. *Chem.-Zeit.*, November 2, pp. 842–844. Gives details of the plant used in the manufacture of this substance.

Monovalent iron, cobalt, and nickel. II. W. Manchot and F. Kaesz. *Berichte*, October 15, pp. 2175–2180.

ORGANIC.—The oxidation of phenols with hydrogen peroxide in the presence of iron salts. H. Goldhammer. *Biochem. Zeitschrift*, October 7, pp. 81–87.

The hydrogenation of anthracene. II. Transformations of octhracene (octahydroanthracene)-sulphonic acid. G. Schroeter. *Berichte*, October 12, pp. 2035–2045.

The fission of heterocyclic compounds of coal tar. R. Weiszgerber and C. Seidler. *Berichte*, October 12, pp. 2088–2090.

The preparation of 2 : 3–diaminopyridine through the amination of 3–aminopyridine. A. Konopnicki and E. Plazek. *Berichte*, October 12, pp. 2045–2047.

Miscellaneous

ANALYSIS.—The volumetric determination of antimony and arsenic. P. E. Winkler. *Bull. Soc. Chim. Belgique*, October, pp. 491–501 (in French).

GENERAL.—The temperature of fusion of organic substances. J. Timmermans. *Bull. Soc. Chem. Belgique*, October, pp. 502–508 (in French).

ORGANIC.—Derivatives of petroselinci and petroselidinic acids. A. Steger and J. van Loon. *Rec. Trav. Chimiques Pays-Bas*, October 15, pp. 703–708 (in English).

Nitration of α-4-methoxy and α-4-ethoxy-phenyl-β-ethylurea. H. F. J. Lorang. *Rec. Trav. Chimiques Pays-Bas*, October, pp. 635–652 (in English).

A synthesis of phenylcoumalin and a new synthesis of a quinoline derivative. J. Kalff. *Rec. Trav. Chimiques Pays-Bas*, October, pp. 594–599 (in English).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

278,399. Dyes and Dyeing. Morton Sundour Fabrics, Ltd., Carlisle, J. Morton, Longlands, Lancaster, B. Wylam, Carr House, Regent Street, Lancaster, J. E. G. Harris, Murrell Hill House, Carlisle, and J. I. M. Jones, 39, Westbourne Road, Lancaster. Application date, May 3, 1926. Addition to 251,491.

The processes described in Specification No. 251,491 (see The Chemical Age, Vol. XIV, p. 577) are modified by the use of diluents such as acetone or nitrobenzene, which do not react with the esterifying agent and are miscible with ordinary tertiary bases. In an example, dimethoxy-dibenzanthrone is added to a mixture of dry light pyridine, acetone and sodium chlorsulphonate, and the mixture heated to 40° C. and zinc dust added. The mixture is cooled and precipitated by adding to cold water. The suspension is filtered and the residue extracted with soda ash solution and treated with salt to precipitate the colour. The product is a reddish paste giving pink shades, which may be developed with an acid oxidising agent to the original green shade of dimethoxy-dibenzanthrone (caledon jade green). Another example deals with the conversion of flavanthrone in suspension in a mixture of light pyridine and nitrobenzene.

278,411. Zinc Waste, Process for the Treatment of. E. Bury, Whitchester, Haltwhistle, Northumberland. Application date, March 24, 1927.

Zinc waste is treated with sulphuric acid, and the zinc sulphate is treated with an excess of ammonia to obtain soluble zinc-ammonium compounds. Any iron and aluminium are thus precipitated as hydrates and are removed by filtration. Any gelatinous silica can be carried down with the iron and aluminium by sedimentation before filtering. The solution is evaporated to precipitate the zinc hydrate and to liberate any excess of ammonia, which is recovered. The zinc hydrate is calcined to zinc oxide and the remaining ammonium sulphate crystallised.

278,417. Colouring Matters, Production of. L. J. Hooley, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application date, July 2, 1926.

Specification No. 264,916 (see The Chemical Age, Vol. XVI, p. 262) describes the preparation of 2-amido-3-chloranthraquinone by the condensation of 3-amido-4-chlorbenzoylbenzoic acid. This product can be brominated to obtain 1-brom-2-amido-3-chloranthraquinone and the product can be chlorinated to obtain 2-amido-1 : 3-dichloranthraquinone. In this invention the latter products are condensed with a primary aliphatic amine, such as methylamine, or a primary aromatic amine, such as aniline or paratoluidine. The condensation product may be separated by crystallisation from butyl alcohol or by steam distillation. The products may be treated with sulphuric acid or with oleum to obtain substances which are soluble in water and may be used for dyeing wool, silk, and cellulose acetate. A number of examples of these products is given.

278,444. Organic Compounds of Arsenic, Manufacture of. R. W. E. Stickings, The Rowans, Ravensbury Park, Morden, Surrey, and May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.11. Application date, July 8, 1926.

The process is for the manufacture of 1 : 4-aryl-isoxazine-arsinic acids by condensing an α-halogenated acyl halide with an aryl-arsinic acid containing adjacent amino and hydroxy groups and eliminating halogen halide from the acylated product to form the 1 : 4-isoxazine ring. Thus 3-amino-4-hydroxy phenyl arsinic acid may be condensed with chloracetyl chloride to obtain 3-chloracetyl-amino-4-hydroxy-phenyl-arsinic acid, which by internal condensation involving the hydroxy group may be converted into 3-hydroxy-1 : 4-benzisoxazine-6-arsinic acid. If α-halogenated acetyl halides are employed comprising a substituent group, such as an alkyl or aryl group in the α-position, isoxazine derivatives substituted in the 2-position are obtained. The first stage of the reaction is a primary condensation involving the amino group and yielding an α-halogenated acyl derivative, and the second stage is a secondary condensation involving the hydroxy group and resulting in the formation of the 1 : 4-isoxazine ring. The intermediate product may be isolated if desired. The two condensations are effected by any suitable methods. The initial amino hydroxyaryl arsinic acid may be dissolved in caustic alkali and the solution treated with the acyl halide by the Schotten-Baumann method. The reaction mixture is made alkaline and boiled, and the 1 : 4-aryl-isoxazine-arsinic acid is precipitated on acidification. Some examples of these products are given.

278,463. Chlorides of Orthohydroxy-Carboxylic Acids of Polynuclear Hydrocarbons, Manufacture of. British Synthetics, Ltd., Trafford Park, Manchester, and E. B. Higgins, Aldwych House, Aldwych, London, W.C.2. Application date, July 20, 1926.

It is known that 2 : 3-oxy-naphthoyl chloride can be obtained by treating 2 : 3-oxynaphthoic acid with thionyl chloride. If the latter is used in excess and the mixture distilled in vacuo the reaction is rapid but the cost of the thionyl chloride is high and internal condensations leading to the formations of xanthrone are liable to take place. If excess of thionyl chloride is not used an excess of solvent must be employed which makes the reaction slow. It is now found that the chloride of an aromatic ortho-hydroxy-carboxylic acid of a polynuclear hydrocarbon can be obtained by intimately mixing thionyl chloride with a finely powdered inorganic salt of the acid. No excess of thionyl chloride is necessary and internal condensations do not take place. In an example, dry mono-sodium 2 : 3-oxynaphthoate is finely powdered and treated in a ball mill with thionyl chloride at a temperature not above 60° C. The thionyl chloride is introduced by a pipe passing through hollow trunnions in the ball mill and ending in a fine jet. The resulting yellow powder contains sulphur dioxide, which is removed by a stream of dry air. The 2 : 3-oxy-naphthoyl chloride is obtained in a highly pure condition, and may be used for the manufacture of intermediate products for producing azo dyestuffs by processes as described in Specification No. 262,958 (see The Chemical Age, Vol. XVI, p. 90). Other inorganic salts of the acid may be employed and the thionyl chloride may be admitted in the form of vapour.

278,577. Steam Distillation of Coal and the Like. Synthetic Ammonia and Nitrates, Ltd., and R. E. Slade, Billingham, Stockton-on-Tees, Durham. Application date, February 21, 1927.

The steam charged with volatile products from the coal is cooled but not much de-superheated and is then used in a steam boiler or heat exchanger for raising fresh steam. The steam is de-superheated to a temperature of 150° C. to 200° C. at atmospheric pressure by scrubbing with oil or water in a packed tower in counter-current to the steam. If water is used it is practically all vaporised and the tar and oils condense in a dry state. If oil is used as the scrubbing agent, the liquid collected contains the primary tar and oils washed from the gas. The oil may be heated to drive off the lighter portions and the residue used for scrubbing. The oils may be collected at different parts of the tower to obtain a partial fractionation of the tar and oils. The steam which is still superheated is used to generate fresh clean steam in the boiler or heat exchanger at a pressure at least equal to that of the heating steam. Alternatively, the steam may be raised at a pressure below the working pressure and then compressed and superheated for use in the retort. The steam may be superheated and then compressed by injection of high pressure steam in a thermo-compressor.

(*Continued on page* 445.)

(*Continued from page* 444)

278,578. HYDROGEN AND PHOSPHORIC ACID, PROCESS FOR PRODUCING. E. Urbain, 6, Rue Lyautey, Paris. International Convention date, December 7, 1926.

It is known that phosphoric acid and hydrogen can be obtained by reaction between phosphorus and water at 600° C. to 1,000° C., but it has now been found that the reaction will proceed at 350° C. in the presence of amorphous carbon and hydrochloric, hydrobromic, or hydriodic acid. The phosphorus vapour and water vapour and hydrochloric acid may be passed over absorptive carbonaceous material which is maintained at or about 350° C. The hydrochloric acid is recovered by condensing the vapours, and the phosphoric acid is recovered by washing the material. Alternatively, the phosphorus may be absorbed by the carbon at 300°–350° C. and then treated with hydrochloric acid and water vapour.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 255,876 (W. Demann), relating to neutralisation of ammonium sulphate crystals, see Vol. XV, p. 331; 258,553 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of heterocyclic compounds, see Vol. XV, p. 501; 274,016 (F. Krupp. Akt.-Ges.), relating to treatment of low carbon steel and iron, see Vol. XVII, p. 31 (Metallurgical Section); 276,295 (F. G. Liljenroth), relating to oxidation of ammonia by means of oxygen, see Vol. XVII, p. 373.

International Specifications not yet Accepted

276,668 and 276,687. PURIFYING HYDROGEN. Gewerkschaft der Steinkohlenzeche Mont-Cenis, Sodingen, Germany. International Convention dates, August 26 and 30, 1926.

276,668. Carbon dioxide, hydrogen sulphide, and sulphur dioxide are removed from gases containing hydrogen by treating with dissolved, solid, or fused alkalies. The gas is then treated at an increased pressure and temperature with a catalyst containing finely divided nickel, chromium, manganese, zinc, or vanadium, either as metals or oxides. The treatment with alkalies, and then with the catalyst, is then repeated. The catalyst may be obtained by impregnating a carrier with the nitrates of the metals, and then decomposing in the presence of hydrogen at as low a temperature as possible. Carbon monoxide is removed by the catalytic treatment. The hydrogen may be employed for ammonia synthesis.

276,692. MONOBENZOYL-DIAMINOANTHRAQUINONES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, August 30, 1926.

Benzoyl chloride is treated with a diaminoanthraquinone, which may be dissolved in an organic solvent, in the presence of an acid-fixing agent such as pyridine, quinoline, sodium carbonate, or magnesia. The monobenzoyl-diamino-anthraquinone is obtained by fractional crystallisation from an aliphatic alcoholic solution of the mixture of benzoylated products. Examples are given of the treatment of 1 : 4- and 1 : 5-diaminoanthraquinone.

277,034. COLOURING INDIARUBBER. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 4, 1926.

Colours fast to vulcanisation are produced by mixing the rubber with insoluble metal salts of triarylmethane dyestuffs having a sulpho group in *o*-position to the methane carbon atom or of a sulphonic acid or carboxylic acid of an anthraquinone derivative having at least one free or substituted amino group. Barium and calcium salts of Patent blue A, Alizarine direct violet R, Alizarine cyanide green G, 1-amino-4-phenyl-amino-anthraquinone-2-sulphonate and 1-amino-4-*p*-acetyl-aminoanthraquinone-2-sulphonic acid are used.

277,285. 2 (3′ : 4′-diaminobenzoyl) benzoic acid. Newport Co., Delaware, Wis, U.S.A. (Assignees of R. Adams and J. M. Davidson, Urbana, Ill., and I. Gubelmann, 1202, Fairview Avenue, South Milwaukee, Wis., U.S.A.) International Convention date, September 13, 1926.

2 (3′-nitro-4′-aminobenzoyl) benzoic acid is reduced by means of iron powder and dilute acetic acid to obtain 2 (3′ : 4′-diamino-benzoyl) benzoic acid. The 2 (3′-amino-4′-alkyl or arylamino-benzoyl) benzoic acids are similarly obtained.

277,293. EXTRACTING CONSTITUENTS FROM COAL. A. Pictorius, Kattowitz, and F. C. Bunge, Mikolow, Polish Upper Silesia. International Convention date, September 8, 1926.

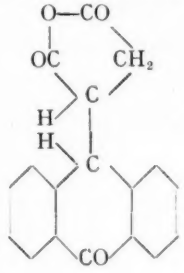
Powdered or lump coal is extracted with pyridine under pressure and then carbonised. The residue is a voluminous product suitable for coal dust firing, for making explosives, for reducing metal compounds, for making carbides, silicides, or electrodes. The solvent need not be removed before distillation.

277,338. VULCANISATION ACCELERATORS. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of C. M. Carson, 395, Mell Avenue, Akron, Ohio, U.S.A.) International Convention date, September 7, 1926.

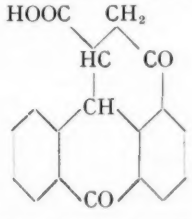
Vulcanisation is accelerated by means of sulphides of the thiophenols, amidothiophenols, thiazoles, etc., obtained by treating the mercaptan or its salts with sulphur chloride, *e.g.*, mercapto-benzothiazyl disulphide is obtained by treating mercapto-benzothiazole with sulphur chloride in carbon tetrachloride or other non-aqueous liquid.

277,342. BENZANTHRONE DERIVATIVES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 10, 1926. Addition to 268,830.

Reduction products of anthraquinone and its derivatives containing oxygen in the meso-position are condensed with maleic acid, ester, or anhydride, or fumaric acid or ester, to obtain benzanthrones substituted in the Bz-positions. The reacting substances are first heated together to obtain intermediate products, which are then treated with acid condensing agents to convert them into benzanthrone derivatives. Anthrone and maleic anhydride may be heated together to obtain a product having the constitution



which when treated with an acid condensing agent such as aluminium chloride and nitrobenzene is converted into a dihydro-benzanthrone derivative such as



or by oxidation and elimination of carbon dioxide, Bz-1-oxybenzanthrone. If anthrone is heated with diethyl fumarate and sulphuric acid, poured into water, and salted out, a Bz-1-oxybenzanthrone-sulphonic acid is obtained.

LATEST NOTIFICATIONS.

279,774. Process and apparatus for the continuous treatment o hydrocarbons. Allgemeine Ges. für Chemische Industrie. November 1, 1926.

279,784. Process for treating material and artificial cellulose fibres with alkali. Chemische Fabrik vorm. Sandoz. October 29, 1926.

279,786. Process in the reduction of solutions containing titanium, iron, and eventually other compounds. Titan Co. Aktieselskab. October 28, 1926.

279,788. Method of softening and purifying water. Hoganäs-Billesholms Aktiebolag, and Nordiske Natrolith Aktieselskabet. October 29, 1926.

279,790. Process for the oxidation of alkyl-aryl-substituted dithiocarbamic acids to the corresponding disulphides. Silesia Verein Chemischer Fabriken. October 30, 1926.

279,796. Manufacture of cellulose esters of inorganic acids. I.G. Farbenindustrie Akt.-Ges. October 26, 1926.

279,801. Manufacture of amino-cellulose derivatives. I.G. Farbenindustrie Akt.-Ges. October 30, 1926.

279,811. Process for the production of high per cent. calcium cyanamide or magnesium cyanamide or mixture thereof. Caro, Dr. N., and Frank, Dr. A. R. October 27, 1926.

279,812. Process for the production of the cyanamides of the alkaline earth metals and of magnesium. Caro, Dr. N., and Frank, Dr. A. R. October 28, 1926.

279,819. Catalytic apparatus. Selden Co. October 27, 1926.

279,825. Heating carbonaceous materials. I.G. Farbenindustrie Akt.-Ges. October 28, 1926.

279,855. Process for the manufacture of alkylisopropyl-phenols and their hydrogenation products. Chemische Fabrik auf Actien (vorm. E. Schering). October 26, 1926.

279,856. Process for the manufacture of condensation products from cresols and ketones. Chemische Fabrik auf Actien (vorm. E. Schering). October 26, 1926.

279,857. Process for the manufacture of decomposition compounds from condensation products of *m*- and *p*-cresol with ketones. Chemische Fabrik auf Actien (vorm. E. Schering). October 26, 1926.

279,863. Manufacture of hardened casein products. I.G. Farbenindustrie Akt.-Ges. October 26, 1926.

279,864. Process of printing with vat-dyestuffs. I.G. Farbenindustrie Akt.-Ges. October 26, 1926.

279,877. Manufacture of stable solid solutions of salts of aromatic sulphonic acids. I.G. Farbenindustrie Akt.-Ges. October 27, 1926.

279,884. Process for the manufacture of higher alkylated guanidine derivatives. Chemische Fabrik auf Actien (vorm. E. Schering). October 28, 1926.

279,888. Spinning artificial silk. I.G. Farbenindustrie Akt.-Ges. October 30, 1926.

Specifications Accepted with Date of Application

255,892. Organic arseno compounds, Process for the production of. A. Binz and C. Rath. July 22, 1925.

255,896. Decamphorated oil of turpentine, Process for treating. I.G. Farbenindustrie Akt.-Ges. May 25, 1925. Addition to 239,878.

260,232. Low carbon metals and alloys, Process for the manufacture of G. E. R. Nilson. October 22, 1925.

262,830. Dyeing cellulose acetate silk. I.G. Farbenindustrie Akt.-Ges. December 14, 1925.

264,879. Monodiazo compounds of 1:4-diamino-anthraquinone-mono- or di-sulphonic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 25, 1926.

265,994. Carbon di-sulphide, Process for the manufacture of. J. Komlos, A. Komlos, and E. F. Engelke. February 16, 1926.

268,728. Dehydrating alcohol by distillation, Process of. U.S. Industrial Alcohol Co. March 30, 1926.

268,778. Recovery of high percentage acetic acid from solutions of acetyl cellulose in acetic acid, Process for. Verein für Chemische Industrie Akt.-Ges. April 1, 1926.

270,352. Yellow azo dyestuff, Manufacture of. I.G. Farbenindustrie Akt.-Ges. May 3, 1926.

276,307. Dibasic calcium hypochlorite, Method of maintaining the stability of. I.G. Farbenindustrie Akt.-Ges. August 18, 1926.

279,156. Extracting or removing metals from materials containing the same, Processes for. A. R. Powell, E. C. Deering, and Johnson, Matthey and Co., Ltd. July 19, 1926.

279,184. Coal gas, Apparatus for purifying. G. Crisp. July 28, 1926.

279,205. Vat dyes of the benzanthrone series, Manufacture and use of. British Dyestuffs Corporation, Ltd., A. Shepherdson, and S. Thornley. August 26, 1926.

279,219. Ores and the like containing titanium and iron, Treatment of. C. A. Klein and R. S. Brown. September 17, 1926.

279,273. Impregnating metals and other materials with aluminium and aluminium alloys, Process for. W. Smith. December 14, 1926.

279,274. Thorium alloys and methods of preparing the same. E. C. R. Marks (*Kemet Laboratories Co. Inc.*) December 17, 1926.

279,280. Vulcanisation process and product. A. C. Burrage. January 4, 1927.

279,283. Reduction of aromatic nitro compounds. W. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) April 21, 1926.

279,316. Fuel gases, Process for the production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*) March 22, 1927. Addition to 214,544.

279,336. Stabilised latex and method of making the same. Rubber Latex Research Corporation. January 3, 1927.

279,347. Catalytic production of hydrocarbons from oxides of carbon and hydrogen. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 30, 1927.

Applications for Patents

Bates, L. T. Hydrogenating coal. 29,039. October 31. (United States, November 23, 1926.)

Boehringer, A., Boehringer Sohn, C. H. Process for preparing tetrazoles. 29,170. November 1. (Germany, November 10, 1926.)

Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Dyeing, etc., wool and silk. 29,570. November 4.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of primary hydroaromatic bases. 29,661. November 5.

Cassella and Co. Ges., L. Anthanthrone dyestuffs. 29,303. November 2. (Switzerland, November 2, 1926.)

Garland, C. S., and Pickard J. Edge filtration. 28,970. October 31.

Gill, H. A., and Naamlooze Vennootschap Chemische Fabriek Delta. Process for obtaining alkaloids. 29,537. November 4.

Green, A. G. Manufacture of derivatives of acridine. 29,189. November 2.

I.G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Manufacture of dyestuffs. 29,009, 29,010. October 31.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Carrying out photo-chemical gas reactions. 29,259, 29,260. November 2.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of acetaldehyde, etc. 29,261. November 2.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Dyeing, etc., wool and silk. 29,570. November 4.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Treating exhaust gases from combustion motors. 29,640. November 5.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Low-temperature carbonisation of carbonaceous material. 29,641. November 5.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Treating liquids with gases, etc. 29,642. November 5.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of primary hydroaromatic bases. 29,661. November 5.

I.G. Farbenindustrie Akt.-Ges. Photographic developers. 29,011. October 31. (Germany, November 13, 1926.)

I.G. Farbenindustrie Akt.-Ges. Purifying magnesium, etc. 29,176. November 1. (Germany, November 13, 1926.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of motor fuels. 29,397. November 3. (Germany, November 26, 1926.)

Imperial Chemical Industries, Ltd. Production of briquetted fuel. 29,243. November 2.

Imperial Chemical Industries, Ltd. High-pressure joints. 29,362. November 3.

International Sugar and Alcohol Co., Ltd. (Soc. Industrielle de la Cellulose). Treatment of cellulose-containing materials with mineral acids. 29,288. November 2.

Johnson, J. Y. Manufacture of acetaldehyde, etc. 29,261. November 2.

Kunstharzfabrik Dr. F. Pollak Ges. Manufacture of phenol formaldehyde condensation products. 29,440. November 3. (Austria, May 21.)

Lush, E. J., Technical Research Works, Ltd. Hydrogenation of naphthalene. 29,526. November 4.

Metallbank und Metallurgische Ges. Akt.-Ges. Production of active carbon. 29,131. November 1.

Naamlooze Vennootschap Chemische Fabriek Delta. Process for obtaining alkaloids. 29,537. November 4.

Alleged Company Fraud

At the Mansion House, on Friday, November 4, Sir Charles Buckworth-Herne-Soame, Bart., Robert George Harley, and Colonel Edmund Octavius Eaton were summoned for conspiring together between January 1, 1914, and the present date, with other persons, to defraud such persons as might receive prospectuses and (or) pamphlets issued by the Chalk Fuel, Power, Gas and By-Products Corporation, Ltd., and obtaining money from them by falsely pretending that certain reports appearing in the prospectuses and (or) pamphlets were true and genuine reports upon the fuel referred to. Mr. William M. Mackay, an analytical and consulting chemist, of Leeds, gave evidence of having in 1914 made tests of briquettes of a chalk composition and said an important part of his report was left out of the prospectus. The case was adjourned.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.
ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.
ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.
ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages extra.
BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.
BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases: prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE.—4½d. per lb.
POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.
SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia £37 to £45 per ton, carr. paid.
SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.
SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.
SODIUM BICHROMATE.—3½d. per lb.
SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.
SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.
SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.
SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.
SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.
SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7½d. to 8d. per lb. Crude 60's, 2s. 3d. to 2s. 5d. per gall.
ACID CRESYLIC 99/100.—2s. 11d. to 3s. per gall. 97/99.—2s. 4½d. to 2s. 8d. per gall. Pale, 95%, 2s. 3d. to 2s. 6d. per gall. Dark, 95%, 2s. 1d. to 2s. 3d.
ANTHRACENE.—A quality, 2½d. per unit. 40%, £5 per ton.
ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7¾d. to 8d. per gall.
BENZOLE.—Crude 65's, 9½d. to 9¾d. per gall., ex works in tank wagons. Standard Motor, 1s. 1½d. to 1s. 2½d. per gall., ex works in tank wagons. Pure, 1s. 5d. to 1s. 6d. per gall., ex works in tank wagons.
TOLUOLE.—90%, 1s. 4d. to 1s. 8d. per gall. Firm. Pure, 1s. 6d. to 2s. per gall.
XYLOL.—1s. 3d. to 1s. 10d. per gall. Pure, 1s. 9d. per gall.
CREOSOTE.—Cresylic, 20/24%, 10d. to 11d. per gall.; middle oil, 8d. to 9d. per gall. Heavy, 8¾d. to 9d. per gall. Standard specification, 7½d. to 7¾d. ex works. Salty, 7d. per gall. less 1½%.
NAPHTHA.—Crude, 9d. to 10d. per gall. Solvent 90/160, 9½d. to 10d. per gall. Solvent 95/160, 1s. 3d. to 1s. 4d. per gall. Solvent 90/190, 9½d. to 1s. 3d. per gall.
NAPHTHALENE CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed or hot pressed, £8 per ton.
NAPHTHALENE.—Crystals, £11 10s. to £13 10s. per ton. Quiet. Flaked, £12 10s. to £13 per ton, according to districts.
PITCH.—Medium soft, 85s. to 87s. 6d. per ton, f.o.b., according to district. Market firm.
PYRIDINE.—90/140, 5s. 9d. to 6s. 6d. per gall. 90/180, 4s. 6d. to 5s. per gall. Heavy, 4s. to 4s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID BENZOIC.—1s. 9d. per lb.
ACID GAMMA.—4s. 6d. per lb.
ACID H.—3s. per lb.
ACID NAPHTHIONIC.—1s. 6d. per lb.
ACID NEVILLE AND WINTHER.—4s. 9d. per lb.
ACID SULPHANILIC.—8½d. per lb.
ANILINE OIL.—8d. per lb. naked at works.
ANILINE SALTS.—8d. per lb. naked at works.
BENZALDEHYDE.—2s. 3d. per lb.
BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.
BENZOIC ACID.—1s. 8½d. per lb.
o-CRESOL 29/31° C.—5½d. per lb.
m-CRESOL 98/100%.—2s. 7½d. per lb. Only limited inquiry.
p-CRESOL 32/34° C.—2s. 8½d. per lb. Only limited inquiry.
DICHLORANILINE.—1s. 10d. per lb.
DIMETHYLANILINE.—1s. 11d. per lb.
DINITROBENZENE.—8½d. per lb. naked at works. £75 per ton.
DINITROCHLORBENZENE.—£84 per ton d/d.
DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.
DIPHENYLAMINE.—2s. 10d. per lb. d/d.
a-NAPHTHOL.—2s. per lb. d/d.
B-NAPHTHOL.—10d. per lb. d/d.
a-NAPHTHYLAMINE.—1s. 3d. per lb.
B-NAPHTHYLAMINE.—3s. per lb.
o-NITRANILINE.—5s. 9d. per lb.
m-NITRANILINE.—3s. per lb. d/d.
p-NITRANILINE.—1s. 7d. to 1s. 8d. per lb.
NITROBENZENE.—6d. per lb. naked at works.
NITRONAPHTHALENE.—1s. 3d. per lb.
R. SALT.—2s. 2d. per lb.
SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.
o-TOLUIDINE.—7½d. to 8½d. per lb.
p-TOLUIDINE.—2s. per lb. naked at works.
m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.
N. W. Acid.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 10s. to £10 per ton. Good demand. Grey, £14 10s. to £15 per ton. Liquor, 9d. per gall.
CHARCOAL.—£6 to £9 per ton, according to grade and locality. Foreign competition severe.
IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.
RED LIQUOR.—9d. to 10d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. 11d. to 4s. 3d. per gall. Solvent, 4s. 3d. per gall.
WOOD TAR.—£4 to £5 per ton.
BROWN SUGAR OF LEAD.—£40 15s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.
BARYTES.—£3 10s. to £6 15s. per ton, according to quality.
CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.
CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.
CARBON BLACK.—5½d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity, drums extra.
CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.
DIPHENYLGUANIDINE.—3s. 9d. per lb.
INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.
LAMP BLACK.—£35 per ton, barrels free.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPHONE, 30%.—£22 10s. per ton.
MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.
SULPHUR.—£9 to £11 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.
THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.
THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.
VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.
ZINC SULPHIDE.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.
ACID, ACETYL SALICYLIC.—2s. 3½d. to 2s. 5d. per lb.
ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. to 1s. 3d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 40s. to 43s. per cwt.; powder, 44s. to 47s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s per lb.
ACID, CITRIC.—1s. 6¾d. to 1s. 7½d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P. PULV.—1s. 2½d. to 1s. 4d. per lb.; Technical.—11½d. to 1s. per lb. Good demand.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 3½d. per lb., less 5%.
AMIDOL.—9s. per lb., d/d.
ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—8s 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: 1s. per lb.
ATROPINE SULPHATE.—9s. 6d. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—10s. 4d. to 10s. 7d. per lb.
BISMUTH CITRATE.—9s. 10d. to 10s. 1d. per lb.
BISMUTH SALICYLATE.—8s. 10d. to 10s. 1d. per lb.
BISMUTH SUBNITRATE.—8s. 4d. to 8s. 7d. per lb.
BISMUTH NITRATE.—6s. 1d. to 6s. 4d. per lb.
BISMUTH OXIDE.—13s. 10d. to 14s. 1d. per lb.
BISMUTH SUBCHLORIDE.—13s. 10d. to 14s. 1d. per lb.
BISMUTH SUBGALLATE.—8s. 1d. to 8s. 4d. per lb. Extra and reduced prices for smaller and larger quantities respectively; Liquor Bismuthi B.P. in W. Qts. 1s. 1d. per lb.; 12 W. Qts. 1s. per lb.; 36 W. Qts. 11½d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 26s. to 29s. per cwt. according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 9½d. to 1s. 11d. per lb.; sodium, 2s. to 2s. 2d. per lb.; ammonium, 2s. 2d. to 2s. 4d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—1s. 2d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. 1d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. '730—1s. 1½d. to 10½d., drums; other gravities at proportionate prices.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—4s. 9d. to 5s. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gal. B.P., 10 vols., 2s. 3d. per gal. In carboys. Winchesters, 2s. 11d. to 3s. 9d. per gal.; 20 vols., 4s. 3d. per gal.; Winchesters, 5s. per gal. Special prices for larger quantities.
HYDROQUINONE.—2s. 11d. to 3s. 2d. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE.—B.P., 2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy Commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 17s. 9d. per lb. net; Synthetic detached crystals, 9s. to 12s. 6d. per lb., according to quantity; Liquid (95%), 11s. 3d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s. 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10d. to 5s. 11d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 9d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—11s. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—4s. to 4s. 3d. per lb.
PHENOLPHTHALEIN.—6s. 6d. to 6s. 9d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—98s. per cwt. less 2½%.
POTASSIUM CITRATE.—B.P.C., 1911; 1s. 8d. to 1s. 11d. per lb.; U.S.P.: 1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb. according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz. bulk in 100 oz. tins.
RESORCIN.—3s. 9d. to 4s. per lb., spot.
SACCHARIN.—55s. per lb.; in quantity lower.
SALOL.—2s. 4d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923—1s. 11d. to 2s. 1d. per lb. for 1-cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—90s. to 95s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 7½d. to 1s. 9d. per lb. Crystal, 1s. 8½d. to 1s. 10d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 9d. to 7s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 2d. per lb.
THYMOL.—Puriss., 10s. to 10s. 3d. per lb., according to quantity. Firmer. Natural, 14s. 3d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—5s. 3d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—16s. 6d. per lb.
COUMARIN.—10s. per lb.
CITRONELLOL.—13s. 9d. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—8s. 6d. per lb.
GERANIOL (PALMAROSA).—18s. 6d. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—13s. 6d. per lb.
LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 18s. 6d. per lb. Ex Shui Oil, 14s. 6d. per lb.
METHYL ANTHRANILATE.—8s. 6d. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—35s. per lb.
MUSK XYLOL.—8s. per lb.
NEROLIN.—4s. 6d. per lb.
PHENYL ETHYL ACETATE.—12s. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—32s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 8d. per lb.
VANILLIN.—16s. 6d. to 17s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 11s. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—26s. per lb.
BOURBON GERANIUM OIL.—13s. 6d. per lb.
CAMPHOR OIL.—75s. per cwt
CANANGA OIL, JAVA.—15s. 9d. per lb.
CINNAMON OIL LEAF.—6d. per oz.
CASSIA OIL, 80/85%.—7s. 3d. per lb.
CITRONELLA OIL.—Java, 1s. 10d. per lb., c.i.f. U.K. port for shipment over 1928. Ceylon, pure, 1s. 8d. per lb.
CLOVE OIL.—5s. per lb.
EUCALYPTUS OIL, AUSTRALIAN.—2s. 2d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 17s. per lb.
LEMON OIL.—7s. 3d. per lb.
LEMONGRASS OIL.—4s. 6d. per lb
ORANGE OIL, SWEET.—11s. 3d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—10s. per lb.
PEPPERMINT OIL.—Wayne County, 15s. 9d. per lb.; Japanese, 8s. per lb.
PETITGRAIN OIL.—8s. 6d. per lb.
SANDALWOOD OIL.—Mysore, 26s. 6d. per lb.; 90/95%, 16s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, November 10, 1927.

BUSINESS has been quite active and trade would seem to be in a much healthier condition, especially on forward account. Prices generally are unchanged, but where there are changes these are in the upward direction. Export trade has been satisfactory and inquiry is well maintained.

General Chemicals

ACETONE is firm at £63 per ton, with advantage for larger quantities.

ACID ACETIC continues in good demand at £37 to £38 per ton for 80% ; export trade is improving.

ACID FORMIC is in increased demand, and price is firm at £44 to £45 per ton.

ACID LACTIC is unchanged at £43 per ton for 50% by weight and business is good.

ACID OXALIC is extremely firm, with a rising tendency at £30 per ton ; demand has been most active.

ALUMINA SULPHATE.—This market has advanced, and price is now extremely firm at £5 15s. per ton for 17/18%.

AMMONIUM CHLORIDE is unchanged but firm at £19 per ton ; demand better.

BARIUM CHLORIDE is moving well into consumption at about £8 10s. to £9 per ton.

COPPER SULPHATE is unchanged at £23 per ton, and good business is reported at this figure. There is a strong inquiry in the market owing to the rising tendency of the metal.

EPSOM SALTS are in good demand at £4 7s. 6d. per ton.

FORMALDEHYDE is active, and the price is very firm at £41 to £41 10s. per ton.

LEAD ACETATE.—Unchanged at £42 10s. per ton for white, with brown at 10s. per ton less.

LEAD NITRATE.—Firm and in fair request at £39 10s. per ton.

LIME ACETATE.—Unchanged.

METHYL ACETONE.—Fairly active at £54 to £55 per ton, with supplies inclined to be on the light side.

POTASSIUM CHLORATE is firmer and in short supply, and makers are disinclined to quote forward.

POTASSIUM PERMANGANATE.—Only a small demand is reported, and the quotation remains unchanged at 6¼d. to 6½d. per lb. for B.P.

POTASSIUM PRUSSIATE continues in fair demand at current figures.

SODIUM ACETATE is becoming exceedingly short ; prices are rising, and the market now stands at £19 10s. to £20 5s. per ton according to quantity and position.

SODIUM BICHROMATE.—Demand is satisfactory at 3¼d. per lb.

SODIUM CHLORATE.—Here also the market has advanced and supplies are short ; the quotation is from £26 to £28 per ton.

SODIUM NITRITE is in good demand and inclined to go higher at £19 10s. per ton.

SODIUM PRUSSIATE.—Firm at 4½d. per lb.

SODIUM SULPHIDE.—Unchanged.

ZINC SULPHATE.—Quite a firm business has been transacted at the current figure of £13 10s. to £14 per ton.

Coal Tar Products

There is little change to report in the values of coal tar products from last week, the market remaining quiet.

90's BENZOL is unchanged at about 1s. 4d. to 1s. 5d. per gallon on rails, while the motor quality is quoted at 1s. 1½d. to 1s. 2½d. per gallon.

PURE BENZOL is worth about 1s. 6½d. to 1s. 7d. per gallon, on rails.

CREOSOTE OIL is firm, and is quoted at about 7½d. per gallon on rails in the north, while the price in London is about 8½d. per gallon.

CRESYLIC ACID is unchanged at about 2s. 2d. per gallon, ex works, for the pale quality, 97/99% ; while the dark quality, 95/97%, is worth about 1s. 11d. per gallon.

SOLVENT NAPHTHA is quoted at about 10d. per gallon, on rails.

HEAVY NAPHTHA is unchanged, being worth about 11d. per gallon, on rails.

NAPHTHALENES are steady, at about £6 15s. to £7 per ton for the 74/76 quality, and at about £8 to £8 15s. per ton for the 76/78 quality.

PITCH is steady at 85s. to 90s., f.o.b. U.K. ports.

Latest Oil Prices

LONDON, November 9.—LINSEED OIL steady and occasionally 2s. 6d. to 5s. per ton higher. Spot, ex mill, £29 15s. ; November, £28 15s. ; December, £29 ; January-April, £29 10s. ; May-August, £30 2s. 6d. RAPE OIL quiet. Crude, extracted, £44 10s. ; technical, refined, £46 10s., naked, ex wharf. COTTON OIL quiet. Refined common edible, £43 10s. ; Egyptian, crude, £37 5s. ; deodorised, £45 10s. TURPENTINE inactive. American, spot, 35s. ; December, 35s. 3d. ; January-April, 37s. per cwt.

HULL, November 9.—LINSEED OIL.—Spot to December, £29 15s. ; January-April, £29 17s. 6d. ; May-August, £30 2s. 6d. per ton naked. COTTON OIL.—Bombay, crude, £33 ; Egyptian, crude (new), £37 ; edible, refined, £40 ; technical, £37 ; deodorised, £42 per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £39 10s. per ton, naked. GROUND NUT OIL.—Crushed/extracted, £45 10s. ; deodorised, £49 10s. per ton. SOYA OIL.—Extracted and crushed, £35 15s. ; deodorised, £39 5s. per ton. RAPE OIL.—Crude/extracted, £43 ; refined, £45 per ton, net cash terms, ex mill. CASTOR OIL and COD OIL unchanged.

South Wales By-Products

THE South Wales by-product market remains quiet. Pitch is still featureless, but a few inquiries have been circulated from now on to January. There has been no change in prices, which rule from 77s. 6d. to 82s. 6d. per ton. Solvent naphtha has a weak demand at 10d. to 1s. 1½d. per gallon, f.o.r. maker's works. Crude naphthalene has a steady, though quiet, demand at £4 10s. to £5 per ton. Tars are steady, crude tar being quoted from 60s. to 65s. per ton ; coke oven tar 8½d. to 9d. per gallon ; gasworks tar at 7d. to 7¾d. per gallon, f.o.r. maker's works, and 10d. to 1s. delivered in barrels. Patent fuel and coke exports continue good, and the demand ensures steady business for some time to come. Coke (best foundry) is quoted at 35s. to 37s. 6d., and other sorts from 27s. 6d. to 35s. per ton. Patent fuel is 23s. to 24s. 6d. per ton. Patent fuel exports for the three weeks ending November 1 totalled 25,580 tons, Brazil and the Argentina being the largest buyers.

VICKERS, LTD., and Sir W. G. Armstrong, Whitworth and Co., Ltd., after several months of negotiation have signed a provisional agreement between the two companies for the amalgamation of certain of their important works and businesses.

Nitrogen Products

Export.—During the past week the sulphate of ammonia market has remained firm. British producers are quoting £9 10s. to £9 12s. 6d. per ton, f.o.b. U.K. port in single bags for prompt shipment. It is reported that the price tends upwards on the Continent and in the United States. The large consuming countries in the tropics continue to purchase substantial quantities.

Home.—The home trade is unusually quiet, even for the autumn. It is not expected that there will be any deviation from the schedule of prices announced by British producers in August last, and therefore, there is little interest in this commodity.

Nitrate of Soda.—The nitrate market has been quieter during the last fortnight, and prices have shown a slight reaction. In consuming markets the price c.i.f. chief ports for prompt arrival varies from £10 6s. to £10 17s. 6d. per ton according to market. For spring delivery, prices are 5s. to 8s. higher. The f.o.b. market has been dull. The price has been firm at 17s. 9d. to 18s. per metric quintal for prompt shipment.

Railway Rates

IN order to secure the continuance of any exceptional railway rates after January 1, traders must either obtain the agreement in writing of the railway company concerned to its continuance, or notify the intention to refer the question to the Railway Rates Tribunal. In order to save traders the necessity of making individual applications, the railway companies and the trading organisations have agreed to a scheme under which the traders have undertaken to examine the new rate books to assure themselves that the rates used since 1924 have been provided for by new exceptional rates, or have been absorbed by the standard rates. Where a rate used since 1924 has not been provided for, the trader should communicate with the railway company concerned.

SMOKE ABATEMENT was discussed at a meeting held at the Guildhall, London, on Friday, November 4, at which Mr. Neville Chamberlain, Minister of Health, was present. On the motion of Sir Henry Jackson, M.P., the conference agreed to appoint an advisory committee, consisting of representatives of local bodies and industrial associations, to consider steps to secure a reasonable measure of uniformity in the by-laws and administration relating to smoke abatement.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, November 9, 1927.

THE heavy chemical market continues moderately active, but export inquiry has rather fallen off. Prices remain on about the same level as last reported.

Industrial Chemicals

ACETONE, B.G.S.—Quoted £59 to £62 per ton, ex store, according to quantity.

ACID ACETIC.—98/100%, glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80%, technical, £37 10s. per ton, ex wharf.

ACID, BORIC.—Crystals, granulated, or small flakes, £34 per ton. Powder, £36 per ton, in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 7½d. per lb, f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Offered at 1s. 6½d. per lb., less 5 per cent., ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80%.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Rather brighter, but prices unchanged at about 3¾d. per lb., ex wharf, for prompt shipment or 3¾d. per lb., ex store, spot delivery.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In little demand, and price nominally 1s. 2½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material quoted £5 12s. 6d. per ton, ex store. On offer for early delivery at £5 5s. per ton, c.i.f. U.K. ports.

ALUM POTASH.—Lump quality quoted £8 5s. per ton, c.i.f. U.K. ports; crystal meal, 10s. per ton less. Lump quality on spot offered at £9 per ton, ex store.

AMMONIA, ANHYDROUS.—Unchanged at about 9d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanizers' crystals of British manufacture unchanged at £23 to £24 per ton, ex station. Continental on offer at £19 15s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £17 10s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Spot material on offer at £20 15s. per ton, ex store. Quoted £20 5s. per ton, ex wharf, prompt despatch from mines.

BARIUM CARBONATE, 98/100%.—English material on offer at £7 5s. per ton, ex station. Continental quoted £7 per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £6 17s. 6d. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4 ton lots. Spot material, 10s. per ton extra. Continental on offer at £7 5s. per ton, ex wharf.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price, £5 to £5 5s. per ton, ex station, with a slight reduction for contracts. Continental rather cheaper at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports, for export.

COPPER SULPHATE.—Continental material rather dearer. Now quoted £23 per ton, c.i.f. U.K. ports. British material on offer at £24 per ton, ex store.

FORMALDEHYDE, 40%.—On offer at £37 5s. per ton, c.i.f. U.K. ports. Spot material quoted £39 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material on offer at about £28 per ton, ex store.

LEAD, WHITE.—Quoted £28 10s. per ton, ex store.

LEAD ACETATE.—White crystals quoted £39 15s. per ton, c.i.f. U.K. ports; brown about £38 10s. per ton, c.i.f. U.K. ports. Spot material on offer at £42 15s. per ton, ex store, spot delivery.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH CAUSTIC.—88/92%.—Solid quality quoted £28 15s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Under 15-ton lots, £29 10s. per ton. Liquid, £15 per ton, minimum 15-ton lots. Under 15-ton lots, £15 7s. 6d. per ton, c.i.f. U.K. ports.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quality now on offer at £25 10s. per ton, ex wharf; spot material quoted £26 10s. per ton, ex store; 90/92% quality offered from the Continent at £24 per ton, ex wharf.

POTASSIUM CHLORATE, 99/100%.—On offer from the Continent at £25 10s. per ton, c.i.f. U.K. ports, for powdered quality; crystals, 30s. per ton extra.

POTASH NITRATE.—Quoted £20 per ton, c.i.f. U.K. ports. Spot material available at £21 per ton, ex store.

POTASH PERMANGANATE, B.P. CRYSTALS.—Quoted 6½d. per lb., ex store, spot delivery.

POTASH PRUSSIATE (YELLOW).—Unchanged at about 6½d. per lb., ex store, spot delivery. Offered from the Continent at 6¾d. per lb., ex wharf.

SODA.—Caustic-Powdered, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station, minimum 4-ton lots on contract. Spot material 10s. per ton extra.

SODIUM ACETATE.—In good demand and rather scarce for prompt delivery. Quoted £18 5s. per ton. c.i.f. U.K. ports. British material on offer at £22 per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra; alkali, 58%, £8 10s. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 10s. per ton, ex store, minimum 4-ton lots. Continental on offer at about £8 2s. 6d. per ton, ex wharf, prompt shipment. Pea crystals of British manufacture quoted £15 5s. per ton, ex station, 4-ton lots.

SODIUM NITRITE, 100%.—Quoted £19 10s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—In moderate demand and price unchanged at about 4¼d. per lb., ex store. Offered for prompt shipment from the Continent at 4⅛d. per lb., ex wharf.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—Prices for English material as follows: 60/62%, solid, £10 10s. per ton; broken, £11 10s. per ton; flake, £13 5s. per ton; crystals, 31/34%, £7 10s. per ton to £8 5s. per ton, according to quality, delivered your works, minimum 4-ton lots on contract. Prices for spot delivery, 5s. per ton higher for solid, 2s. 6d. per ton for crystals. Offered from the Continent at about £9 5s. per ton, c.i.f. U.K. ports. Broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; floristella, £9 10s. per ton; ground American, £9 5s. per ton—ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports. Powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material quoted £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Action of Liquid Hydrogen Sulphide on Metals

WORKING in France, MM. Fournier and Lang have just described the experiments which they have been carrying on for more than ten years on the action of liquefied gases on iron, copper, and zinc. They found that liquid hydrogen sulphide below 60° C. does not attack either iron, copper, or commercial aluminium. Metal plates left for 15 years in contact with liquid hydrogen sulphide show no traces of corrosion or attack, a fact which should permit the construction of containers for hydrogen sulphide for transport, as in the case of liquid chlorine containers.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, November 10, 1927.

A moderately active business in chemical products on the Manchester market, more particularly the heavy materials, is being put through at a generally steady range of quotations, instances of even slight reaction this week being fewer than usual. Inquiries for forward deliveries, principally from home trade consumers, continue to circulate in fair numbers. Inquiry for shipment, however, is on somewhat quiet lines.

Heavy Chemicals

A quiet trade in phosphate of soda is being transacted, and values are maintained at up to £12 15s. per ton. Offers of chlorate of soda are being made at between 2¾d. and 2⅞d. per lb., but there is not a great deal of buying interest being displayed. A moderate business is being done in bicarbonate of soda, and prices are firm at round £10 10s. per ton. The demand for hyposulphite of soda is on the slow side, and, if anything, offers are a shade lower at from £16 to £16 5s. per ton for the photographic, and £9 7s. 6d. for the commercial material. Some business is passing in the case of saltcake on the basis of £3 10s. per ton or thereabouts, with Glauber salts quiet but unchanged at £3 5s. Current quotations for sulphide of sodium are round £10 7s. 6d. per ton for the 60-65 per cent. concentrated solid quality, and £8 10s. for the commercial; the demand for this material is rather inactive. Bichromate of soda is in fair request and values are firm at round 3⅛d. per lb. There is no change in the position of caustic soda; demand is of a quietly steady nature and prices are fully maintained at from £14 10s. to £16 10s. per ton, according to quality. Offers of nitrite of soda keep steady at £19 2s. 6d. per ton, and a moderate trade has been reported. Alkali is well held at about £6 15s. per ton, and meets with a fair demand. There is not a great deal of business in the case of prussiate of soda, but round 4¼d. per lb. is still being asked.

Bichromate is a steady section among the potash compounds at from 4¼d. to 4⅜d. per lb. Permanganate of potash continues rather slow, but there is little alteration in the price situation, B.P. being quoted at 6¼d. to 6½d. per lb., and commercial at 5⅛d. Yellow prussiate of potash is obtainable at 6¾d. per lb. without attracting very much attention from users. Carbonate of potash is well held at round £26 10s. per ton, and a fair trade is being put through. Caustic potash is in a somewhat similar position, with quotations for this material ranging from £29 10s. to £30 per ton. Chlorate of potash is still a quiet trade, but values are maintained at about 2¾d. per lb.

A moderate demand is reported for sulphate of copper, and rather cheaper offers are available at about £25 5s. per ton f.o.b. Inquiry for arsenic is on about the same level of the past few weeks, with from £18 to £18 5s. per ton, on rails, currently quoted for white powdered, Cornish makes. There is still an easy feeling about the acetates of lead and business is relatively slow; white acetate is quoted here at about £40 10s. per ton and brown at £39. Nitrate of lead is quiet but unchanged in price at £38 per ton. The acetates of lime continue to display a certain amount of firmness, with grey on offer at £16 10s. per ton and the brown quality at about £10 10s.

Acids and Tar Products

Acetic acid continues to attract a moderate amount of attention and prices are steady at £37 per ton for 80 per cent. commercial and £67 for glacial. Oxalic acid is rather quiet but values are held at from 3½d. to 3¾d. per lb., according to quantity. Tartaric acid is moving off in small quantities at about 1s. 2¾d. per lb. The demand for citric acid is quiet, but quotations are held at about 1s. 6½d. per lb.

A fair amount of interest is being shown in pitch at steady prices, round £4 5s. per ton, f.o.b., now being quoted. There is little movement in the case of solvent naphtha, and 11d. to 1s. per gallon is about as much as can be obtained for this material. Crude carbolic acid is fairly steady at 2s. 6d. to 2s. 7d. per gallon, with prompt offers scarce; crystals are being quoted at up to 7¾d. per lb. Creosote oil is firm at 7¾d. per gallon and inquiry keeps up.

Insecticide Dispute

On Wednesday, in the King's Bench Division, Mr. Justice McCardie had before him a dispute in regard to agency for the sale of insecticide. The plaintiffs were the Bono Co., Ltd., of Clarges Street, Mayfair, and the defendant was Mr. Alexander K. T. Bulkeley, trading as the Ship Cleansing Co., of London Street, Mark Lane, E.C. Plaintiffs had obtained judgment against the defendant for £240 for goods supplied, and the issue now before the court was on the counter-claim by the defendant against plaintiffs, for damages for breach of agreement and/or for commission. Mr. Garland, for the defendant, said his case was that Mr. Slattery, the managing director of the plaintiff company, appointed the defendant the sole agent of the company for the sale of insecticide to the marine trade in the United Kingdom at the standard price, less a discount of 33 per cent. Defendant's complaint was that the plaintiffs had committed a breach of the agreement, and he claimed damages. Mr. Van den Bergh said the plaintiffs did not agree that the agency extended to the marine trade in the United Kingdom. They said it was limited to London only, but that as a matter of grace they had paid defendant certain sums arising out of country orders. At the suggestion of his lordship, the parties arrived at a settlement of the action, the claim and counter-claim being withdrawn, each party paying their own costs.

The Berthelot Centenary Celebrations

The Berthelot centenary celebrations, which took place in Paris in the period October 23 to 26, were attended by some 600 foreign delegates, in addition to those from French scientific institutions. The foreign delegates included Professor H. E. Armstrong and Sir William Pope from Great Britain; Professor Schlenk (Germany); Professor M. T. Boger (U.S.A.); Professor A. Pictet (Switzerland); M. Lunatcharsky (Russia); Professor E. Cohen (Holland); while even Abyssinia and Afghanistan were represented. The foundation-stone of the Maison de la Chimie to be associated with the name of Berthelot was formally laid by M. Herriot. It is stated that about 16 million francs has already been collected towards the founding of this institution. A commemorative volume giving a full account of the celebration will be issued.

The University of Birmingham Chemical Society

The first meeting of the current session of the University of Birmingham Chemical Society was held on Monday, October 31, when Professor R. Robinson, of Manchester University, presented prizes and gave an address on "Recent theories of substitution in benzene derivatives." Professor Robinson classified various groups according to their electron-donating or electron-seeking characteristics. He applied the theory of polarisation and the "general electronic effect" to ethylenic compounds and then extended the theory to the case of benzene substitution. Prizes for the 1926-27 session were presented as follows: Frankland Medal and Prize, Mr. F. E. Salt; President's Prize for best student's paper, Mr. J. H. G. Plant; Vice-President's Prize, Mr. R. B. Haines; Society's Discussion Prize, Mr. L. W. Needham.

I.G. Officials in United States

The arrival of several prominent officials of the I.G. Farbenindustrie was awaited with interest in New York. It is assumed in the United States that the motive of their journey was to continue negotiations started at Heidelberg with Mr. W. C. Teagle, president of the Standard Oil Co., for the exchange of patents and closer co-operation. The party consists of Dr. Worlitzer, Dr. Hartmann, Dr. Vossen, Dr. Habig, Dr. Muehlberg, Director-General Schmidt, and Professor Hoff, of Berlin Technical High School.

Carsil One Process Steel

The Anglo-American Steel Co., Ltd., London, write:—"We have received a cutting which appeared in your paper on November 5 referring to Carsil One Process Steel. The cutting is headed 'Steel from Low-Grade Iron Sands,' which is erroneous, as we never use the expression 'Low-Grade Iron Sands,' using instead 'Steel from Titaniferous Iron Sands.' Perhaps you will kindly make the correction."

Company News

ALLEN LIVERSIDGE.—A dividend at the rate of 6½ per cent. per annum is announced for the six months on the preference shares.

BORAX CONSOLIDATED.—An interim dividend of 6d. per share has been declared on the deferred ordinary shares in respect of the year ended September 30.

PAN D'AZUCAR NITRATE CO.—The directors recommend a final dividend of 10 per cent. in respect of the year ended June 30, making a total for the year of 15 per cent., the same as for 1925-26.

LONDON TIN CO.—The net profits for the year ended September 30 amounted to £138,081, and £11,764 was brought forward. A final dividend of 40 per cent. is proposed, making 50 per cent. for the twelve months, adding to the reserve £12,803, and carrying forward £29,671.

OAKBANK OIL.—On account of difficult conditions prevailing in the shale oil industry, the directors announce that they think it advisable to postpone consideration of the payment of the dividend on the 6 per cent. preference shares until the accounts for the year ending March 31, 1928, are available.

WEARDALE LEAD CO.—For the year ended September 30 the net profits were £14,547, and £6,287 was brought forward. A final dividend of 1s. 3d. per share is proposed, making 2s. per share (10 per cent.) for the twelve months, appropriating £1,250 for directors' extra remuneration, writing £3,404 off property, and carrying forward £6,387.

GEORGE M. CALLENDER AND CO.—This company of bitumen manufacturers announce that the net profits for the year ended June 30 were £8,049, and £657 was brought forward. Dividends amounting to 10 per cent. on the preference and 20 per cent. on the ordinary shares for the twelve months are proposed, adding £3,000 to the reserve, and carrying forward £1,630.

EASTERN SMELTING CO.—The net profits for the year ended July 31 were £74,326, and £18,444 was brought forward. A dividend of 15 per cent. is proposed on the ordinary shares, adding £20,572 to the depreciation fund, £12,500 to the income-tax account, and £1,600 to the provident fund, and carrying forward £16,877. The board propose to increase the capital to £500,000 by the creation of 250,000 ordinary shares of £1 each, and to issue to both classes of shareholders one new ordinary share for every two now held.

EASTERN CHEMICAL CO.—The report for the year ended March 31, 1927, states that the result of the year's working, after writing off cost of repairs and upkeep on plant and buildings, was a loss of £5,200. Replacement value of buildings and plant being considerably higher than original cost, the directors do not consider it necessary to make any addition to depreciation reserve account this year. Severe competition referred to in the previous reports reached a climax in the past year, but an arrangement has since been made with the company's principal Bombay competitors, Dharamsi Morarji Chemical Co., Ltd., to place sale of their principal acids in the hands of the Eastern Chemical Co.'s managing agents, E. D. Sassoon and Co., and the firm are now selling all the above products of both firms at stabilised prices. The annual meeting will be held at 13, Fenchurch Avenue, London, E.C., on November 16, at 3 p.m.

SUB NIGEL CO.—In a circular to shareholders the directors state that they have decided to increase immediately the capital of the company in order to provide funds to meet the cost of equipping and sinking a new vertical shaft to a depth of probably 3,600 ft. and to increase the plant to a milling capacity of 25,000 tons per month, also to provide funds for the cost of necessary additions to equipment and plant both on the surface and underground. They propose to increase the capital from £678,750 to £750,000 by the issue of 142,500 shares of the nominal value of 10s. each at £3 10s. per share, such shares to participate in dividends declared as from January 1, 1928. The new shares will be offered to shareholders on the basis of one new share for every ten shares held (fractions ignored) at £3 10s. per share payable in full on application. This will absorb 135,750 shares, the balance being taken by New Consolidated Gold Fields at the issue price. The subscription of the whole of the issue has been guaranteed by New Consolidated Gold Fields at £3 10s. per share, and in consideration that company will be paid a cash commission of 2½ per cent. on the total amount of the issue.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to November 26, 1927.

CELLITAZOL

474,675. Class 1. Chemical substances used in manufactures or philosophical research, and anti-corrosives, but not including photographic chemicals, and not including any goods of a like kind to photographic chemicals. I. G. Farbenindustrie Aktiengesellschaft (a Joint Stock Company organised under the laws of Germany), Mainzer-Landstrasse 28, Frankfort-on-Main, Germany; manufacturers. November 8, 1926. (To be Associated. Sect. 24.) (By consent.)

CELLUSTRE

481,446. Class 1. Cellulose enamel in the nature of paint. Slick Brands, Ltd., Stafford Road Works, Stafford Road, Waddon, Croydon, Surrey; manufacturers. June 10, 1927.

CELLITON

474,676. Class 1. Chemical substances used in manufactures, photography or philosophical research, but not including varnishes or enamels, and not including any goods of a like kind to varnishes or enamels. I. G. Farbenindustrie Aktiengesellschaft (a Joint Stock Company organised under the laws of Germany), Mainzer-Landstrasse 28, Frankfort-on-Main, Germany; manufacturers. November 8, 1926. (To be Associated. Sect. 24.) (By consent.)

AGRIPAX

479,704. Class 2. A liquid insecticide. Pax Manufacturing Company Incorporated (a corporation organised under the laws of the State of New York, United States of America), 40, Water Street, New York, United States of America; manufacturing chemists. April 11, 1927.

SNOW SAN

482,039. Class 2. Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. Synthetic Ammonia and Nitrates, Ltd., The Chemical Works, Billingham, Stockton-on-Tees, Durham; chemical manufacturers. June 30, 1927.

NORTH STAR

482,040. Class 2. Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. Synthetic Ammonia and Nitrates, Ltd., The Chemical Works, Billingham, Stockton-on-Tees, Durham; chemical manufacturers. June 30, 1927. (To be Associated. Sect. 24.)

WYMOLINE

483,009. Class 3. Chemical substances prepared for use in medicine and pharmacy, but not including tooth powders or mouth washes, and not including any goods of a like kind to tooth powders and mouth washes. The British Drug Houses, Ltd., 16 to 30, Graham Street, City Road, London, N.1; wholesale druggists. August 6, 1927.

Chemical Trade Inquiries

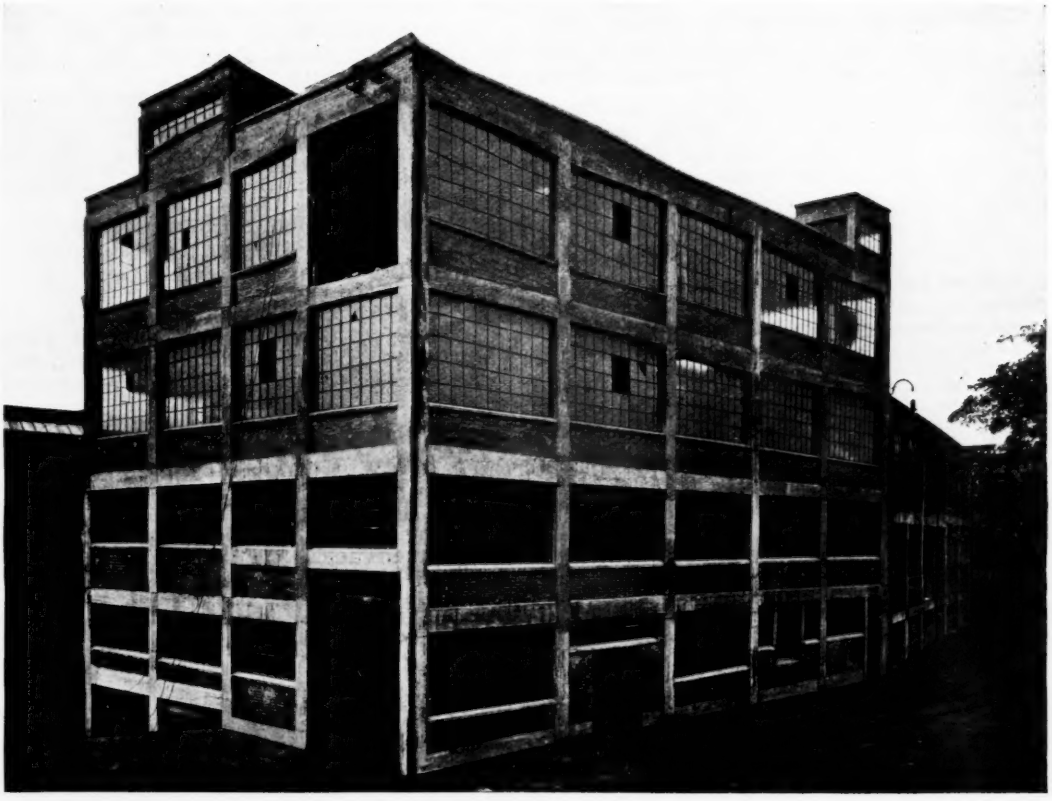
The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

INDUSTRIAL CHEMICALS.—An agent established at Liége, and buying for own account, is desirous of securing the representation of British manufacturers. (Reference No. 394.)

SHELLAC, GUM ARABIC, GUM TRAGANTH, GUM OLIBANUM, COPAL, TURPENTINE OIL, JAPAN WAX.—A firm in Hamburg desire to represent a British firm on a commission basis. (Reference No. 397.)

REINFORCED CONCRETE ENGINEERS

The Kahn System



The Chemical House for Robert Craig & Sons, Ltd., Caldercruix Mills, Scotland.
Erected on the Kahn System of reinforced concrete.

Contractor - - - - J. P. Jamieson, Baillieston.

THE NEW DYEWORKS
LEEKBROOK, STAFFS
for
J. WARDLE & SONS, LTD.
Architects:
E. HOWARD & PARTNERS

The reinforced concrete work for these important works, now under construction, is being carried out to the designs of The Trussed Concrete Steel Co., Ltd.

THE TRUSSED CONCRETE STEEL CO., LTD.

22 CRANLEY GARDENS, SOUTH KENSINGTON, S.W.7

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BAKER AND CO., Camgate Works, Stanwell, oil refiners. (C.C., 12/11/27.) £19 15s. 5d. October 1.

FRANCIS HAMMOND AND CO., LTD., 76, Strand, W.C., antiseptic specialists. (C.C., 12/11/27.) £23 5s. 10d. September 28.

HARPER, Francis Dell, 7, Springfields, Saffron Walden, analytical chemist. (C.C., 12/11/27.) £17 15s. 2d. October 7.

WOODBROOK DRUG CO., Vale Place, Merridale Street, Wolverhampton. (C.C., 12/11/27.) £22 0s. 5d. September 29.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BUSFIELD (CHARLES) AND CO., LTD., Guiseley, woollen dyers, etc. (M., 12/11/27.) Registered October 25, £700 (not ex.), equitable mortgage, to Bank of Liverpool and Martins, Ltd.; charged on 49, 51, and 53, Union Street, Guiseley. *£6,000. March 18, 1926.

HOOD (JOHN), LTD., Beckenham, dyers. (M., 12/11/27.) Registered October 26, charge, to Bank; charged on land and building, at Ravenscroft Road, Beckenham. *£1,077 10s. December 31, 1926.

HUNT (JARED TERRETT) AND SON, LTD., London, E., agricultural chemists. (M., 12/11/27.) Registered October 25, £6,000 debentures; general charge. *Nil. February 10, 1927.

WILKINSON AND SIMPSON, Ltd., Newcastle-on-Tyne, manufacturing chemists. (M., 12/11/27.) Registered October 26, mortgage, to Bank; charged on 24, Newgate Street and Dunn's Buildings, Lower Friar Street, Newcastle-on-Tyne. *£45,000. November 25, 1926.

Satisfaction

WILKINSON AND SIMPSON, LTD., Newcastle-on-Tyne, manufacturing chemists.—Satisfaction registered October 26, £30,000, registered February 14, 1921.

Receiverships

W. JARVIS AND CO., LTD. (R., 12/11/27.) E. J. Stone, C.A., of Wood Street Buildings, 112–113, Fore Street, E.C., was appointed Receiver and Manager on October 31, 1927, under powers contained in debentures dated December 2, 1926.

LOW TEMPERATURE CARBONISATION, LTD. (R., 12/11/27.) Sir William McLintock, C.A., of 71, Queen Street, E.C., ceased to act as Receiver on June 28, 1927.

PHILLI-MIRANO (1926), LTD. (R., 12/11/27.) H. M. Brand, of 1, Museum Street, W.C.1, was appointed Receiver and Manager on October 24, under powers contained in debenture dated January 4, 1927.

SITORA, LTD. (R., 12/11/27.) C. T. Gillespie, of 22, Queen Street, E.C.4, was appointed Receiver and Manager on November 2, under powers contained in instrument dated May 17, 1927.

SOLOMIA (1922), LTD. J. H. Reed, of 84, Waterford Road, Walham Green, S.W.6, ceased to act as Receiver on October 25, 1927.

London Gazette, &c.

Company Winding Up

CHLOROPHYL AND CHEMICAL CORPORATION, LTD. Last day for receiving proofs for intended dividend, November 24. Liquidator, H. E. Burgess, Senior Official Receiver, 33, Carey Street, Lincoln's Inn, London, W.C.2.

Companies Winding Up Voluntarily

ELITE PHARMACY, LTD. (C.W.U.V., 12/11/27.) J. C. Oldfield, 61, Lord Street, Liverpool, appointed as liquidator, November 1. Meeting of creditors, 61, Lord Street, Liverpool, Thursday, November 17 at 11 a.m.

HOLMES (FREDK. G.) AND CO., LTD. (C.W.U.V., 12/11/27.) A. C. Surrey, 7 and 8, Poultry, London, E.C.2, appointed as liquidator, November 2.

INTERNATIONAL PULP AND CHEMICAL CO., LTD. (C.W.U.V., 12/11/27.) By special resolutions, October 18, confirmed, November 2. J. J. Watts, 52, Bedford Square, London, W.C.1, appointed as liquidator. Meeting of creditors, at 52, Bedford Square, London, W.C., on Monday, November 21, at 3 p.m.

STRATHMORE PETROLEUM PRODUCTS, LTD. (C.W.U.V., 12/11/27.) By special resolution, September 24, confirmed, October 21. L. F. Salman, Secretary, 8-9, Essex Street, W.C.2, appointed as liquidator.

TOTAL FIRE EXTINGUISHER CO., LTD. (C.W.U.V., 12/11/27.) J. J. Baker, Eldon Street House, Eldon Street, E.C.2, appointed as liquidator, October 28. Meeting of creditors at Eldon Street House, Eldon Street, E.C.2, Monday, November 14, at 12 noon.

New Companies Registered

WM. BURTON AND SONS (BETHNAL GREEN), LTD., 2, Green Street, Bethnal Green, London, E.2. Registered November 5. Capital, £45,000 in £1 shares (21,000 cumulative Preference and 24,000 Ordinary). To acquire the business carried on at Bethnal Green as Wm. Burton and Sons, to adopt an agreement with C. Burton, J. Burton, and C. H. Burton, and to carry on the business of dye and chemical manufacturers in all its branches, etc. Directors: C. Burton, Redlands, Oakhill Avenue, Hampstead, N.W.3; J. Burton, Yewlands, Hoddesdon, Herts.; C. H. Burton, Yewlands, Hoddesdon, Herts. (all dye and chemical manufacturers). Qualification of permanent directors, £5,000 shares. Remuneration as fixed by the company. Secretary: J. G. Burton. Solicitors: Reynolds and Miles, 70, Basinghall Street, E.C. Registered office: 2, Green Street, Bethnal Green, London, E.2.

F. HULSE AND CO., LTD. Registered November 3. Nom. capital, £100 in 1s. shares. Consulting, analytical, mercantile and manufacturing chemists, chemical, chemical engineering and other like experts and specialists, drug and chemical exporters, importers and merchants, producers of and dealers in superphosphates, guano and other manures, fertilisers and dressings for the soil, insecticides, etc. Directors: F. Hulse, 26, Sholebroke View, Chapeltown, Leeds; Mrs. K. M. Hulse, 26, Sholebroke View, Chapeltown, Leeds.

KEINER AND CO., LTD., 13, Hardwidge Street, London, S.E.1. Registered November 3. Nom. capital, £5,000 in £1 shares. Chemists, druggists, drysalters, oil and colour men, etc. Directors: E. Keiner, H. M. Wood.

REGOL OIL GAS CO., LTD., 426, Bush House, Strand, W.C.2. Registered as a "private" company on November 8. Nom. capital of £200,000 in £1 shares. The objects are to acquire the business and all or any of the assets of the Goldsbrough Patents Co., Ltd., to acquire certain patents, rights, or other like grants and the benefit of applications for the same relating to certain inventions of R. E. Goldsbrough, to carry on the business of treaters of mineral oils and other hydrocarbons, coals, and bituminous minerals; distillers and refiners of oils, shale, asphalt, coal, and other liquids and substances, and all products and fractions resulting therefrom; chemical and explosive manufacturers, gas and dye makers, druggists, chemists, soap makers, metallurgists, colliery proprietors, mine owners, manufacturers of roadmaking material, oil producers, oil smelters, etc.